CONTAINER HUB PORT DEVELOPMENT IN A PERIPHERAL LOCATION

The Case of Indonesia

By

Bahana Wiradanti

A Thesis Submitted in Fulfilment of the Requirements for the Degree of Doctor of Philosophy of Cardiff University

Transport and Shipping Research Group, Logistics and Operations Management Section of Cardiff Business School, Cardiff University

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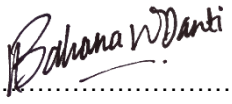

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Summary of Thesis:

The main purpose of this research is to explore how a container hub port in a peripheral location could capture opportunities of growth, or in other words to identify factors for a peripheral port to reduce its peripherality by becoming a hub. A survey research strategy using mixed methods is conducted, with Indonesian ports and maritime transport industry as the focus.

Qualitative interviews were conducted to understand the meaning of peripherality, identify concentration-deconcentration factors and willingness of stakeholders to expand business in peripheral locations. This phase consisted of 13 preliminary interviews to a port operator company and main interviews to 46 respondents which represents 7 types of stakeholders (port operators, shipping lines, cargo owners, logistics companies, central government, local government and financial institutions). Interviews were transcribed and analysed using Nvivo 11, qualitative data software. Meanwhile, quantitative data was collected through an online survey questionnaire to reduce 111 item variables from 7 latent variables identified from literature and interview results. These variables were analysed through Exploratory Factor Analysis, to identify critical factors for a peripheral port to become hub.

Results shows that peripherality is a cycle. Peripheral locations with low cargo volume leads to low shipping connections, low port performance and infrastructure, low economic activities, low population and political power, and returns to low volume. To break out of the cycle, cargo volume needs to be generated, new market and routes opened and hub dependence to be shifted to emerging secondary hubs. Quantitative results show that there are 66 item variables from 3 main factors identified for a peripheral port to become a hub, which are: standardised port operations; clear policy, financed and governance; and positive spatial aspects. Implications of research is addressed to the research sponsor, to the literature and to peripheral ports in developing countries all over the world.

ABSTRACT

This PhD research is sponsored by the Indonesia Port Corporation *(PT. Pelabuhan Indonesia II Persero)* with an aim of identifying ways for Indonesian ports to contribute to the nation's economic growth.

There are always two sides to a story. The large and small; the centre and periphery. Since containerisation in the late 1950s, research in maritime transport has been looking at trends in port competition, how ports are chosen by shipping lines to be their port of call and concentration of cargo in particular ports or regions. From this concentration, large world hub ports have emerged undertaking transhipment activities, enabling economies of scale, cost saving and increased connectivity links to more destinations.

In contrast, this research considers smaller ports in peripheral locations. Increasing containerisation and large ship sizes increased the need for transhipment in order to transport container cargoes around the globe. This includes the rise of secondary hub ports from smaller peripheral ports. The main purpose of this research is to explore how a container hub port in a peripheral location could capture opportunities of growth, or in other words to identify factors for a peripheral port to reduce its peripherality by becoming a hub. Besides contributing to peripheral ports research which is still understudied, this study combines literature from port concentration/deconcentration, peripheral port challenges, port selection factors and hub port choice. The Indonesian ports and maritime transport industry are chosen as the focus of this empirical study because Indonesia is a developing country with one of the longest coast lines and a significant number of small container ports. Furthermore, Indonesian ports are still understudied.

A survey research strategy using mixed methods is conducted. Players in the Indonesian maritime transport industry in a national level is the population for data collection and non-probability sampling is used. Respondents are customers of a port operator company, which approximately handles 50% of the entire flow of goods coming in and out of the country. Qualitative interviews were conducted to understand the meaning of peripherality, identify concentration-deconcentration factors and willingness of stakeholders to expand business in peripheral locations. This phase consisted of 13 preliminary interviews to a port operator company and main interviews to 46 respondents which represents 7 types of stakeholders (port operators, shipping lines, cargo owners, logistics companies, central government, local government and financial institutions). Interviews were transcribed and analysed using Nvivo 11, qualitative data software. Meanwhile, quantitative data was collected through an online survey questionnaire to reduce 111 item variables from 7 latent variables identified from literature and interview results. These variables were analysed through Exploratory Factor Analysis, to identify critical factors for a peripheral port to become hub.

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Acknowledgement

I've had a dream of being a researcher since elementary school by reading books about the world's famous scientists. I've dream of studying in higher education abroad since high school. However, I do not know which field I will be in. I started my journey in Industrial Engineering of *Institut Teknologi Bandung*. Now an employee in the Indonesia Port Corporation and PhD student in Port Economics, Logistics Operations Management Section, Cardiff University.

I am thankful this all happen to me, in this field of knowledge, on this path of life.

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I thank Indonesia Port Corporation *(PT. Pelabuhan Indonesia II)* for fully sponsoring me financially. It is a great honour for the author to investigate and provide solutions for the company and Indonesia in general. Since this is an academic research, hence, the author attempts to uphold principles of academic research, align the aim of this research with the aim of the sponsor, build upon gaps in the literature, and remain neutral.

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For my country, Indonesia.

I hope to make you all proud.

LIST OF ABBREVIATION

AHP	Analytic Hierarchy Process
ASEAN	Association of Southeast Asian Nations
ASL	Archipelagic Sea Lanes
AVE	Average Variance Extracted
CFA_1	Confirmatory Factor Analysis
CFA_2	Common Factor Analysis
CG	Central Government
CMB	Common Method Bias
CO	Cargo Owner
CSR	Corporate Social Responsibility
DC	Distribution Centre
EEZ	Exclusive Economic Zone
EFA	Exploratory Factor Analysis
FAO	Food and Agriculture Organization
FF	Freight Forwarder
FI	Financial Institution
FMCG	Fast-Moving Consumer Goods
GAL	Graph of All Linkages
GDL	Graph of Direct Linkage
GDP	Gross Domestic Product
GNP	Gross National Product
HHI	Herfindahl-Hirschman Index
IAME	International Association of Maritime Economists
ICD	Inland Container Depot
IMO	International Maritime Organisation
KMO	Kaiser –Meyer-Olkin
LC	Logistics Companies
LG	Local Government
LPI	Logistic Performance Indicator
LSCI	Liner Shipping Connectivity Index
LSBCI	Liner Shipping Bilateral Connectivity Index
MINT	Mexico-Indonesia-Nigeria-Turkey
MSA	Measure of Sampling Adequacy
NGO	Non-Government Organisations
NPM	National Port Masterplan
OBOR	One Belt One Road
OECD	Organization for Economic Cooperation and Development
PCA	Principal Component Analysis
PEIS	Port Economic Impact Studies
PO	Port Operator
PPA	Product Portfolio Analysis
PPC	Peripheral Port Challenge
QDAS	Qualitative Data Analysis Software
SEM	Structural Equation Model
SEZ	Special Economic Zone
SIDS	Small Island Developing States
SISLOGNAS	The National Logistics Development Blueprint (SISLOGNAS)
SL	Shipping Line
SSCM	Sustainable Supply Chain Management
ST	Stakeholder Theory

UK	United Kingdom
UN	United Nations
USA	United States of America
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
WTP	Willingnss-to-Pay

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Chapter 1
Introduction

"Finding solutions to the same old problems require new technologies, new channel leaders and new attitudes. The port economist can provide the vision and the tools to bring this about." (Heaver 2006, p.34).

This first chapter introduces the Thesis by describing the research background, research aim and questions in order to explain the motivation and significance of this research. Next, the domain of research is explained which is in the Port Economics field and followed by the Thesis structure and overview of methodology used. Lastly, the research context on Indonesia is described.

1.1 Research Background: Container Hub Ports and Peripherality

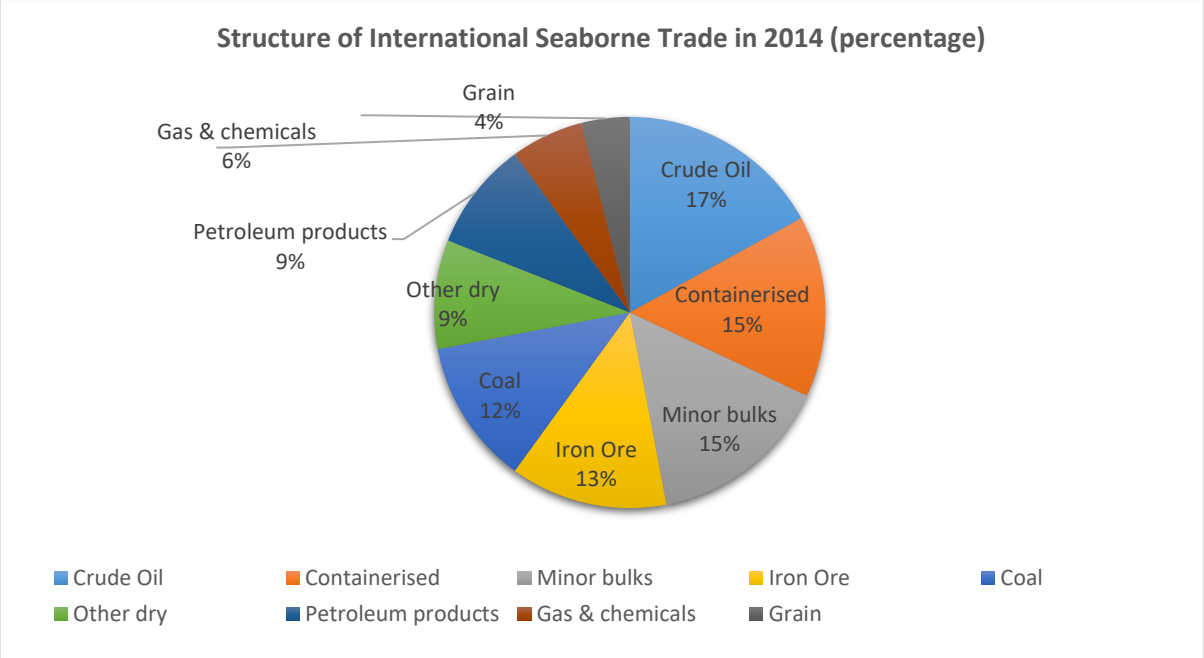
Today, seaports have gained a more important status not only as gateway for trade. Ports are becoming hubs in the logistic chain and contributing value (Robinson 2002), including warehousing, storage, packing, arranging inland transportation modes (Nam and Song 2011), for example with the addition of inland container depots and distriparks as logistic hub services (Pettit and Beresford 2009). Ports are suggested to take part in optimisation of the chain to be able to maintain their existence in international freight movement (Meersman et al. 2005). Not only being efficient and providing low cost service, ports also need to win competition from other port rivals by providing distinct services or having 'differentiation' (Notteboom and Winkelmans 2001).

In the container port industry, the function of hub or transhipment activities are used to consolidate cargo. Even though transhipment activities brings longer transit times and add more costs (Buethe and Kreutzberger 2001; UNESCAP 2007; Wilmsmeier and Hoffman 2008), these ports activities are increasing as demand for container ports grow. Increased use of transhipment hubs started during the 1990s (UNESCAP 2007). World total transhipment volume of containers doubled from 85 million TEU in 2005 (UNESCAP 2007) to 175 million TEU in 2014 and is forecasted to increase up to 320 million TEU by 2020 (Davidson 2014). The world's port container throughput and global transhipment (in TEUs) is shown in Table 1.1. In addition, container cargo is an important sector in the international seaborne trade, since its proportion (15%) is the second largest after crude oil (17%) as shown in Figure 1.1.

Table 1.1 World Container Port Throughput and Transhipment (in TEUs) in 2000, 2014 and Estimation in 2020

Country/Territory	Throughput in Million TEUs		
	2000*	2014*	Estimation in 2020**
Container Port Throughput	235	623	1000
Container Transhipment	58	175	320
% of Transhipment	24.6 %	28 %	32 %

Source: Author, from *UNESCAP (2007), **Davidson (2014)



Source: UNCTAD (2015, p.7)

Figure 1.1 Structure of International Seaborne Trade in 2014

Port researchers has been using various terminologies, seeking similar trends in the development of large 'load centres', 'hub' or 'transhipment' ports. This is as a result of shipping lines or shipping companies taking the benefit of larger economies of scale and increased efficiency by using larger vessels and calling at fewer ports (Hayuth 1981; Meersman et al. 2005). There is a growing literature on the development hub ports, factors to determine its location, shipping carrier's decision making (to be explained in Chapter 2). The term hub port and logistic hub has been defined and discussed comprehensively from a wider context of logistics into more specific maritime logistics (e.g. Buethe and Kreutzberger 2001; Rodrigue and Notteboom 2010; Gouvernal et al. 2011; Nam and Song 2011). Moreover, important container hubs in regions of the world has been identified, such as in Northeast Asia (Ducruet et al. 2010), in the Mediterranean (Fageda 2000), in Europe (Notteboom et al. 2014), also at the global level (Ducruet and Notteboom 2012b; Marei and Ducruet 2016). However, their discussion and analysis pre-dominantly use cases from existing large ports.

On the other hand, there are ports in other parts of the world that are facing challenges other than competition and efficiency concerns, which is the addition of a 'peripherality' condition. In port research, peripherality can be seen as the opposite extreme of busy ports. Peripherality is a term used by Monios and Wilmsmeier (2012) and Wilmsmeier and Monios (2013) to describe the opposite of ports having 'favourable location'. As example, ports in Scotland are mentioned as having 'double periphery' because of lagging infrastructure development (physically) and government initiatives (institutionally) (Monios and Wilmsmeier 2012). Further on, the UK port system is counterbalancing peripherality and concentration since the container ports in north and centre of UK have lost its importance and more concentration is happening in the southeast of UK close to the English Channel (Wilmsmeier and Monios 2013).

Peripherality also means as being dependent to harge hub ports (Ducruet 2008). Meanwhile, in port development literature, the term 'peripheral port challenge' is used as a concept when ports located more remotely are taking away cargo usually handled in larger ports in that particular region (e.g. Hayuth 1981; Slack and Wang 2002; Notteboom 2005). As an example, one of the reasons why peripheral port challenge occurs is because these peripheral ports were early adopters of containerisation (Hayuth 1981). Port research has established the terms 'concentration' and 'deconcentration' factors as the reasons behind the development of large hub ports and peripheral port challenge (e.g. Taaffe et al. 1963; Fleming and Hayuth 1994; Fleming 1997; Notteboom 1997; Ducruet et al. 2009b).

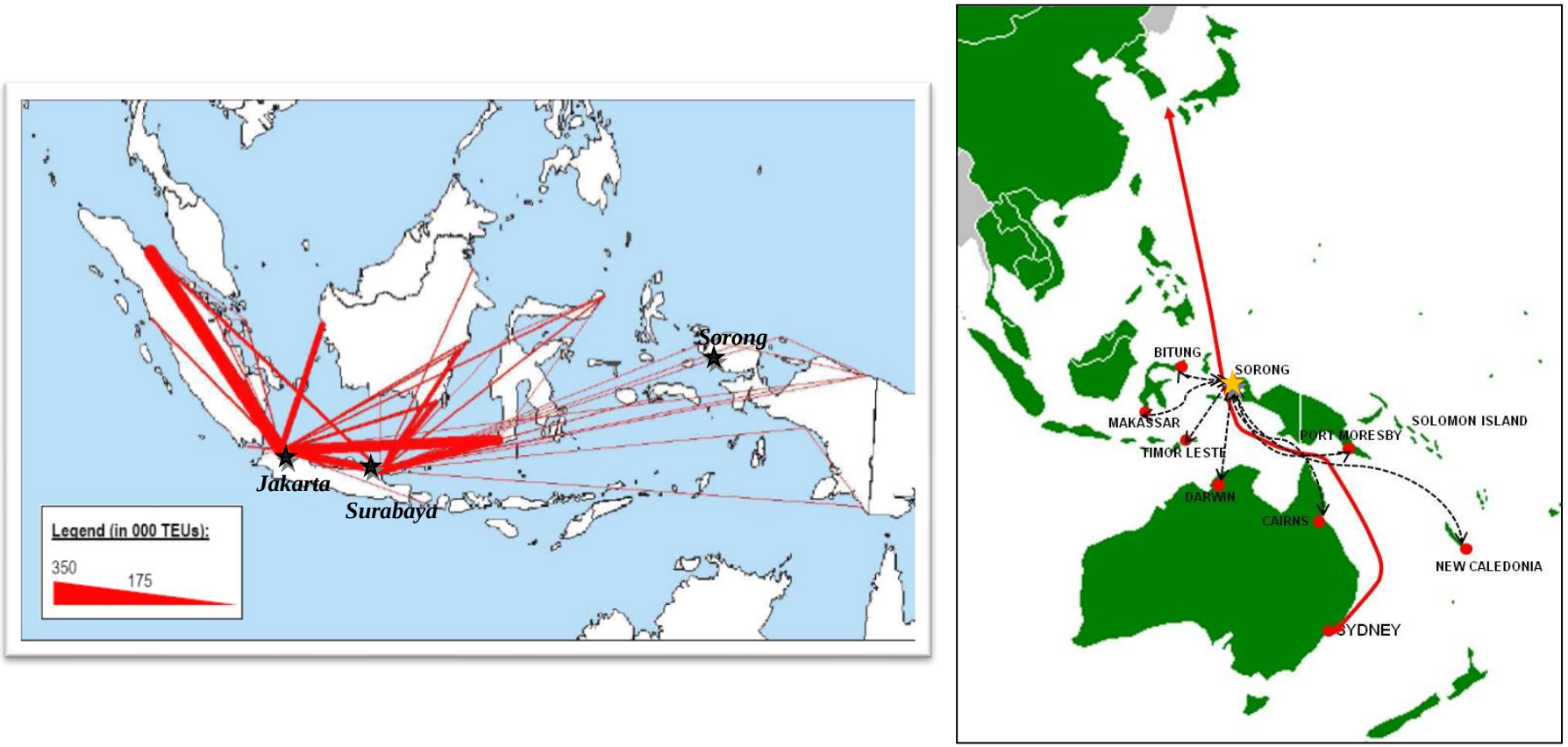
Today, the competition is tougher with countries all over the world, including ports in developing countries or emerging economies, making efforts to reduce its peripherality and actively engaging with more global trade. Peripheral ports are trying to evolve, to become less-peripheral or core. Countries are trying to 'recast' their role based on their potential and geographical location (Wilmsmeier et al. 2010). The success story of Singapore, which takes advantage of Northeast Asia's economic growth, inspires other countries to become transhipment hubs. Emerging economies in different parts of the world not only contributes to expanding their ports for the country's demand but also tries to capture more opportunities from becoming hubs in their region (examples in Appendix 1).

Overall, the research on hub/transhipment ports in peripheral locations, specifically in less-developed or developing economies context is still understudied. Notteboom (2005) argued that small-peripheral terminals or ports should first fulfil their role as local terminals, since it is as important as the large ones with their major hub role, rather than trying to compete. Moreover,

Ducruet et al. (2009b) stated that ports in less-developed economies are understudied since they are considered to not perform well and are not significant in the global network. However, any port from any country or nation or company could still take part in the global competition, whether they are large or small ports, if they could be sustainable financially. The opening of a port should not become a burden for the government or source of losses for port operating companies. In developing countries or emerging economies, this should be an opportunity to be extracted. Therefore, this thesis aims to fill the gap in research.

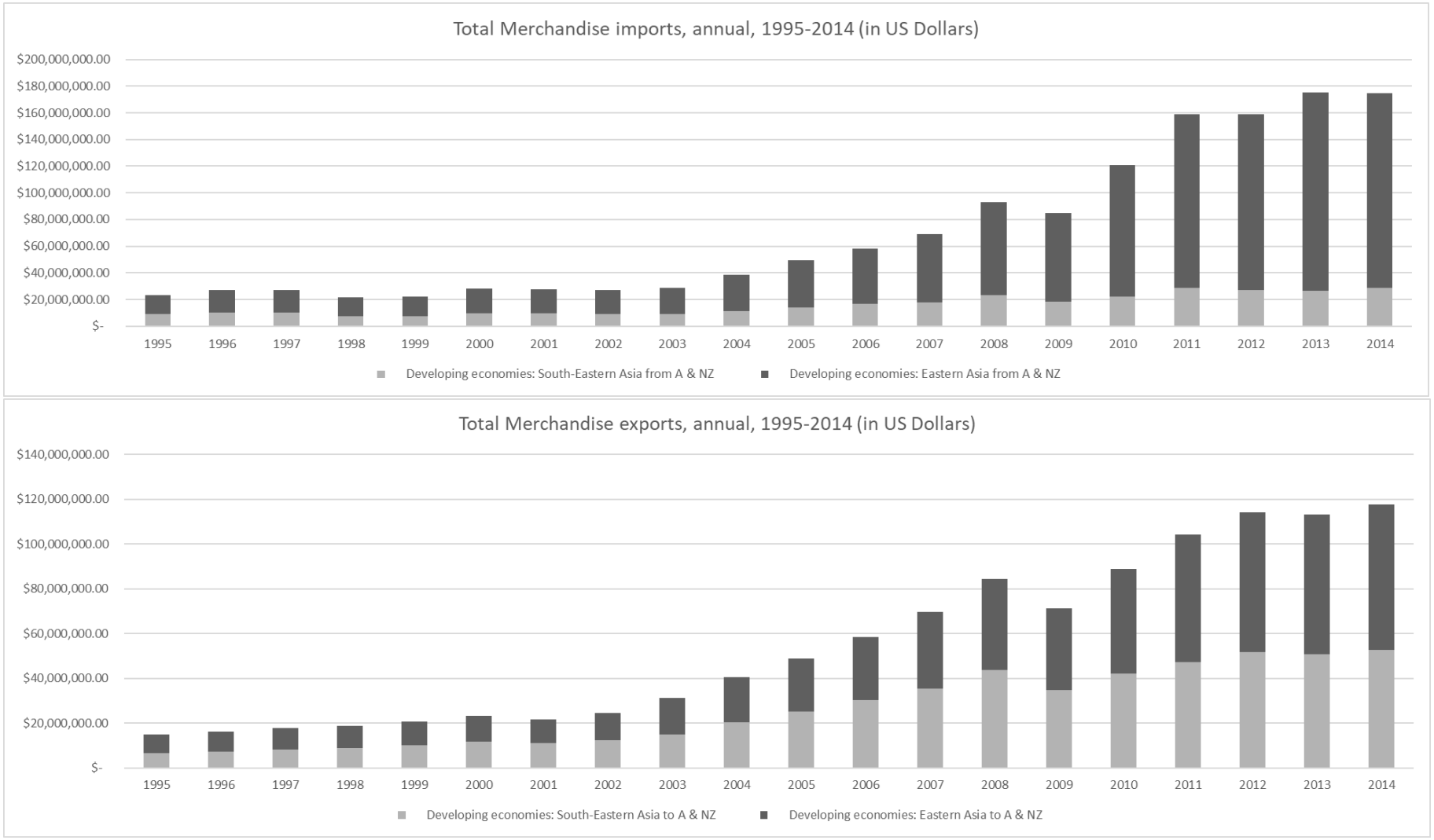
One of the developing countries located in South East Asia, Indonesia, is emerging not only economically but also geographically as a hub. Though under the dominance of Singapore, there is an emerging hub function by the Port of Tanjung Priok in Jakarta and Port of Tanjung Perak in Surabaya for their domestic cargo (Marei and Ducruet 2016). Position of these two ports in Indonesia's domestic cargo distribution are shown in Figure 1.2. They are consistently developing their ports to reduce dependence on Singapore (Leander 2012). Indonesia is a developing country with one of the longest coast lines and a significant number of small container ports. It is the third country, after Japan and China, which has the most 'small ports', served by sub-1,000 TEU vessels (Monios 2017).

Indonesia's eastern region is known to be less developed economically than its western region. During this research, one port company in Indonesia is currently developing a port in Sorong, West Papua province, in the eastern region (map in Figure 1.2). It will become a hub port to consolidate shipments in the region and it is believed it would lower logistic costs for domestic cargo (Meryana 2012). They also plan to attract ships from China to Australia and vice versa to tranship in Sorong, as seen in Figure 1.2 (Indonesia Port Corporations 2012). It is inevitable that the "China effect" in manufacturing and trade also influences the continent Australasian. According to UNCTADstat (2014), there is an increasing trade between East Asia with Australia and New Zealand from 1995 to 2014, as seen in Figure 1.3, and this trend is consistent until recently (UNCTADstat 2018). The existing condition is that Singapore and Tanjung Pelepas connects the route between South–East Asia and East Asia to Australia/New Zealand (Fremont 2007; Notteboom et al. 2014).



Source: Indonesia Port Corporations and Drewry Maritime Advisors (2012)

Figure 1.2 Indonesia's Domestic Cargo Distribution and Port of Sorong Development Plan



Source: Author, compiled from UNCTADStat 2014

Figure 1.3 Total Merchandise Import and Export from East Asia and South East Asia to Australia and New Zealand

Considering that literature in Maritime Economics on peripheral ports, ports in developing economies and Indonesian ports are understudied, hence, the Thesis aims to contribute in this particular setting. The meaning of peripherality in the maritime economics needs to be explored in-depth. Factors or requirements for a peripheral poort to become a hub needs to be identified. Stakeholders in peripheral port development needs to be determined, including thteir willingness to invest in peripheral ports and peripheral locations. In addition, the experience of emerging economies with their increasing function as hub ports also needs to be studied, to capture lessons learned and understand the relevancy with findings from literature. Further on, all the explored factors will be tested in the ongoing Sorong hub port development project in Indonesia. Having the background of Indonesia with its strategic location in Southeast Asia and its eastern region port's inherited peripherality, therefore, Indonesia's maritime transport industry is chosen as the focus of study.

1.2 Research Aim and Reseach Questions

The main aim of this research is to explore how a container hub port in a peripheral location could capture opportunities of growth, or in other words to identify factors for a peripheral port to reduce its peripherality by becoming a hub. Implications of the research not only contributes to the literature, but also to provide guidelines for policy makers and practitioners in port development, especially in less developed and developing countries. Based on the background and gaps in the literature (in Chapter 2), this study will seek to answer the following questions.

RQ1: What is peripherality in the context of maritime economics?

a) Are there certain levels or degrees of peripherality?
b) What are considered as potential peripheral ports?
c) What are potential benefits of peripheral ports?
d) Who are the main stakeholders in peripheral port development?

RQ2: What are the underlying concentration and deconcentration factors for developing a successful hub port in a peripheral location?

a) What are the concentration-deconcentraton factors needed?
b) What are the concentration-deconcentration factors in Indonesia's port development?

RQ3: What are the critical factors for each stakeholder?

a) What are the concentration-deconcentration factors for each stakeholder?
b) How should transhipment services or other value-added services be provided?

RQ4: What are the stakeholders' willingness to invest in peripheral ports?

a) How important are peripheral port development for each stakeholder?

b) What are their willingness to invest in peripheral ports?
c) Which main stakeholder should be the coordinator or integrator in peripheral port development?

1.3 Research Domain: Port Economics

Seaports can be seen as a place to transfer cargo between sea and land transport. They can also be seen as infrastructure. Their main purpose is to provide and facilitate 'intermodal interlinkages', not only for transport but also for trade (Hoyle 2000). Hence, ports have an important role in trade, whether it is international trade or domestic trade in one's country or region. Ports are also seen as an economic unit because they provide transfer services resulting in port 'throughput' (Talley 2009). Their economic function is to benefit traders who pass through them by providing increments, profits or surpluses, either acting as consumers or producers (Goss 1990). In a wider view, ports are 'economic catalysts' for the region it supports, while port's performance is its ability to generate 'economic wealth' (Danielis and Gregori 2013, p.224). The construction and operations of ports becomes a country's 'engine' for economic development (Benacchio and Musso 2001; Talley 2009).

Port research from the 1980s up to 2000 are dominantly related to major academic disciplines which are Economics, Geography and Operations Research (Woo et al. 2011). Given the research objective and questions in Section 1.3, this present research is identified in the domain of Port Economics. Port Economics is an area which studies 'economic decisions' and its consequences for port service providers and users (Talley 2009, p.1). Hoyle (2000) argued that one of the basic principle of Port Geography and Port Economics is to consider a port's long term fortune by looking at a its competitive position compared to other ports. Heaver (2006) describes that Maritime and Port Economics as a knowledge field and its growing trends are not investigation of economics issues in the port environment but are reflecting more on the issues and challenges of the day.

Moreover, besides economics, Maritime and Port Economics are also influenced by naval architects, marine engineers and geographers, with the key influential people are H. Benford from engineering, J. Bird from geography, and R. Goss who initiated the International Association of Maritime Economists or IAME (Heaver 2006). The evolution of port economics since the early days until today has covered changes occurring in bottlenecks and obstacles to reach efficiency, and the changing structure of the industry (Heaver 2006).

Today, the area of port economics, policy and management has become an emerging field. Citation and bibliometric analysis by Pallis et al. (2010) described that journal papers from

1997-2008 in port economics, policy and management field has low coherence, it was conducted by a small core research community, and this is a typical phenomenon for an emerging research field. Main issues or themes in port research especially port economics are identified by these authors in Table 1.2, who have conducted systematic literature review in the field.

Table 1.2 Systematic Literature Review in Port Research

References	Time Horizon	Issues or Themes Identified
Heaver (2006)	1950s - 2000s	Focus in studies on port economics: 1. Relationship of ports with ship costs; 2. Issues of port costs and pricing; 3. Industrial organisation related to ports; 4. Competitive relationship among ports; 5. Assessing port performance; 6. Specialised studies (e.g economic impact and specialised ports).
Pallis et al. (2010), (Pallis et al. 2011)	1997 - 2008	Focus in studies on port research in general: 1. Terminal studies; 2. Ports in transport and supply chains; 3. Port governance; 4. Port planning and development; 5. Port policy and regulation; 6. Port competition and competitiveness; 7. Spatial analysis of seaports.
Woo et al. (2011)	1980 - 2009	Focus in studies on port economics, policy and management: 1. Port policy; 2. Port governance and reform; 3. Port management and strategy; 4. Port competition and performance; 5. Ports in supply chains; 6. Port planning and development; 7. Terminal operations; 8. Spatial analysis.
Ng (2013)	1956-2011	Focus in studies on port geography: 1. Foreland and maritime space (global): Port system; port connectedness; port choice, competition and cooperation; Port'splace in shipping strategies and networks. 2. Hinterland (regional/national): Catchment areas and supply chain linkages; Port, intermodal transportation and supply chain; Inland/ satellite terminal; Port and regional development. 3. Port (local): History and location; Evolution over time; Port operation; Port-city relation. 4. Management, policy and governance. 5. Philosophy and epistemology.
Notteboom et al. (2013)	1973-2012	Focus in studies on maritime policy and management: 1. Terminal studies; 2. Ports in transport and supply chains; 3. Port governance; 4. Port planning and development; 5. Port policy and regulation; 6. Port competition and competitiveness; 7. Spatial analysis of seaports.
Vieira et al. (2014)	1992 - 2013	Focus in studies on governance, governance models and port performance: 1. Case studies on port governance 2. Privatisation, port policy and regulation 3. Port governance models

		4. Others: strategy and roles of port authorities, port performance, institutional plasticity, stakeholder management, etc.
Dutra et al. (2015)	Up to 2013	Focus of evaluation in seaport performance studies: 1. Operational efficiency; 2. Environmental management; 3. Global/strategic performance; 4. Performance in a multi-faceted perspective; 5. Performance from stakeholders; 6. Seaport agility.
Shi and Li (2017)	2000 - 2014	Focus in studies on Maritime Transport: 1. On Shipping: Shipping policy, regulation, and legal issue; Corporate management, stock returns, and performance; Shipping market, industry, freight rate, and economic impact; Shipping risk and maritime security; Shipping finance; Routes and networks; Labor and employment; Shipping cluster, competitiveness, and performance; Sailing speed, green shipping, and environment-related issues; Maritime logistics and supply chain; Operational management, mode choice, empty container; Shipping services; Other: education, discipline, database, etc. 2. On Port: Terminal studies, berth allocation; Ports in transport and supply chain; Port governance, port policy, regulation, and legal issues; Port planning, development, cluster, network, and economic impact; Port management, service, performance, efficiency, and competitiveness; Port choice; Port risk and security; Other: spatial analysis, employment, academic research, etc. 3. On Maritime fleet: Fleet structure, deployment, ownership, and operation; Shipbuilding, demolition, new orders, and second-hand ships; Marine affairs, fishery, etc; Ship registration.
Parola et al. (2017)	1983 - 2014	Focus in studies on governance, governance models and port performance: 1. Port costs; 2. Hinterland proximity; 3. Port geographical location; 4. Port infrastructure; 5. Operational efficiency; 6. Port service quality; 7. Maritime connectivity; 8. Nautical accessibility; 9. Port site.

Source: Author

This thesis research is positioned in Port Economics as part of Maritime Economics, because not only looking at the ports, it also looks at ports in relation to other stakeholders in the maritime transport sector. In the wider view, it relates with economics, geography and transport. Specifically, according to the themes described in Table 1.2, this present research could be positioned under the themes: port planning and development, port competition, port governance, policy and spatial analysis. Domain of present research is shown in Figure 1.4. It combines ideas or concepts of developing economies in economics, peripherality in geography, hub-peripheral pattern in economic geography, port-cities in transport geography, stakeholders in maritime industry, and container ports.

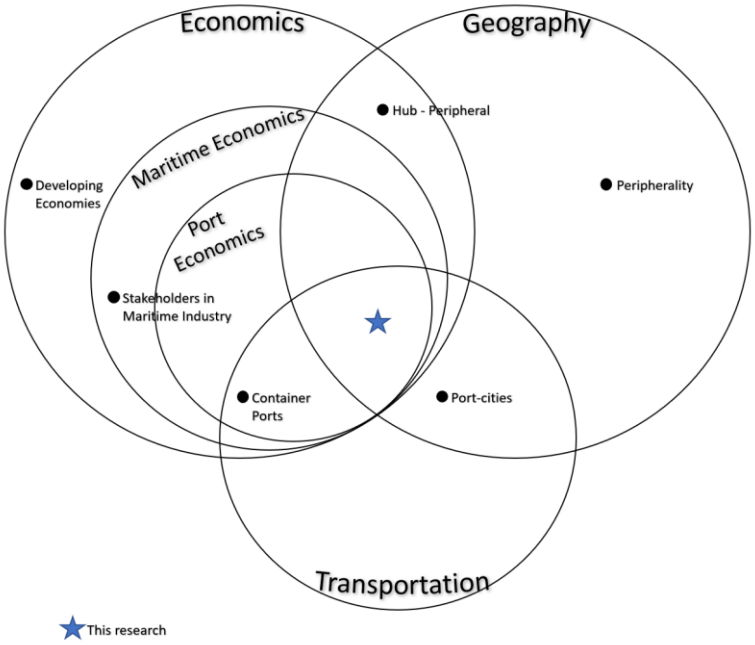


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Figure 1.4 Domain of Present Research

1.4 Thesis Structure and Overview of Research Methodology

Chapter 1 (Introduction) covers the background, research aim, research questions, research domain and research context on Indonesia. Next, is the conceptualisation phase. This is addressed in Chapter 2 (Literature Review on Peripheral Ports, Hub Ports and Willingness to Invest). It covers literature review on the topic and keywords of the thesis. It explains the main concepts of peripheral port, container hub ports system, stakeholders in maritime transport, willingness to invest and identification of research gaps. After literature review conducted and the research questions are determined, a research framework is established identifying the underlying factors for a peripheral port to reduce peripherality and become a hub.

Chapter 3 (Research Methodology) explains the overall justification on methods used in the study. This includes philosophical position of the study, research strategy, mixed methods approach, stakeholder theory as theoretical lens, and ethical considerations. To answer the research questions, this research adopts a pragmatic philosophical position, survey research strategy with mixed methods and Stakeholder Theory as theoretical lens. This chapter continues with the research process. Data is collected in phases which are preliminary interviews, secondary data collection, main interviews, and questionnaire survey online. Different perspectives are collected and analysed such as from the port operators, shipping lines, shippers/cargo owners, logistics companies, central and local government and financial institutions. Qualitative data are analysed by coding and thematic analysis, while

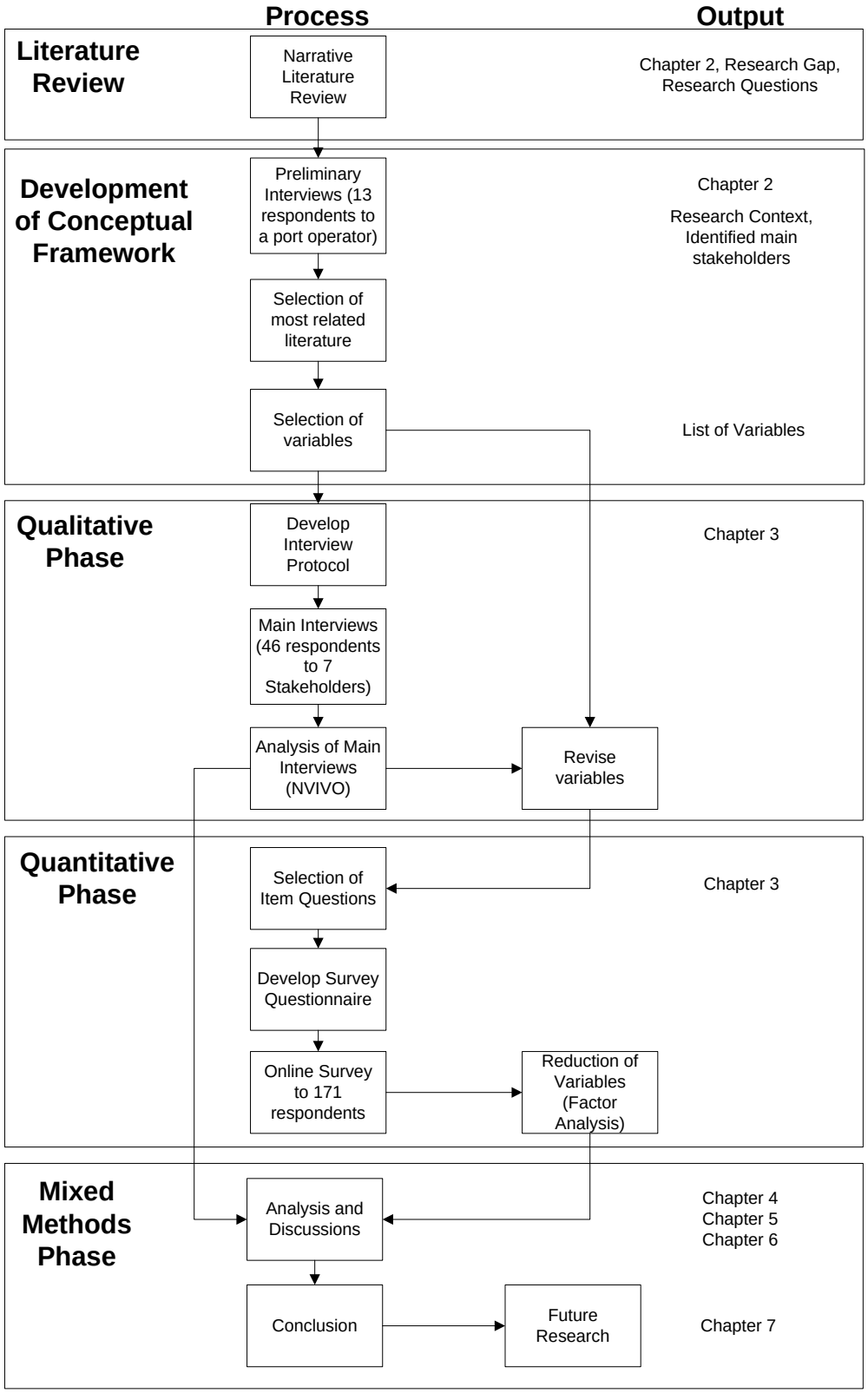
quantitative data are analysed using Exploratory Factor Analysis. Overview of research methodology in this thesis are structured in a flow diagram, shown in Figure 1.5.

Chapter 4 to Chapter 6 are the critical part of the Thesis covering findings and discussion. Chapter 4 (Peripherality in Maritime Economics) includes findings from the qualitative phase of the research and discussions to answer the first research question on peripherality. Chapter 5 (Factors for Peripheral Ports to Become a Hub) includes findings from both qualitative and quantitative phase of the research. It also covers discussions to answer the second and third research question on critical factors needed for a peripheral port to become a hub. Chapter 6 (Stakeholder Willingness to Invest in Peripheral Ports) includes findings from both qualitative and quantitative phase of the research. It also covers discussions to answer the fourth question on stakeholder willingness to invest. Lastly, Chapter 7 (Conclusions) is the closing of Thesis. It covers conclusions for each of the research questions, contribution of thesis, relevance of thesis to the industry and policy and further research.

1.5 Research Context on Indonesia

This section provides information for a basic understanding of Indonesia, its transport geography and port system. The purpose of this section is to explain how present-day Indonesia's structure (e.g. transport, logistics, and communication/command) is formed by its history and experience.

Indonesia is an archipelago country located in Southeast Asia. Indonesia's land area is 1,811,570 km^2 (UNCTADstat 2015), which is approximately 7.4 times of UK's land area. If Indonesia's waters includes her Exclusive Economic Zone, the total area reaches 7.9 million km^2, hence, approximately 60% of their territory is the sea (Hays 2015). Instead of 'our homeland', Indonesians call their country as '*tanah air kita'* which means 'our land and waters'. Indonesia's borders are the Indian Ocean in its west and south, also Pacific Ocean in its northeast, while its land borders are Malaysia in the north, Papua New Guinea in the east and East Timor in the southeast. As the world's largest archipelago with approximately 17,000 islands (Mc Carthy 2005), Indonesia has the second largest coastline in the world after Canada which is 54,716 km (Central Intelligence Agency 2015). Indonesia is also widely known as the fourth largest population in the world after China, India and USA which is 254.4 million people in 2014 (UNCTADstat 2015). This is almost 4 times of UK's population in the same year.



Source: Author

Figure 1.5 Research Flow Diagram

Indonesia's largest islands respectively from the west to the east are Sumatera, Java, Kalimantan, Nusa Tenggara, Sulawesi, Maluku (Moluccas) and Irian Jaya (Papua). Indonesia's economic indicators shows a 5.02% GDP growth rate in 2016, which is under India and China; above the UK, the US and Japan (World Bank 2018). This growth rate is quite stable after the 1998 crisis. However, Indonesia's position by GDP per capita is far below those three developed economies, with $ 3,570 in 2016 (World Bank 2018). This shows that Indonesia has a moderately good economic growth, however, not good considering its large population. In terms of Foreign Direct Investment, Boumphrey (2014) argued that Indonesia has been an investor favourite in the last few years. With its sheer scale, population and increasing productivity, Indonesia should be the first among emerging MINT countries to be monitored (Boumphrey 2014). A map of Indonesia with simplified names of the main islands and her position compared to other countries by economic indicators are described in Figure 1.6.

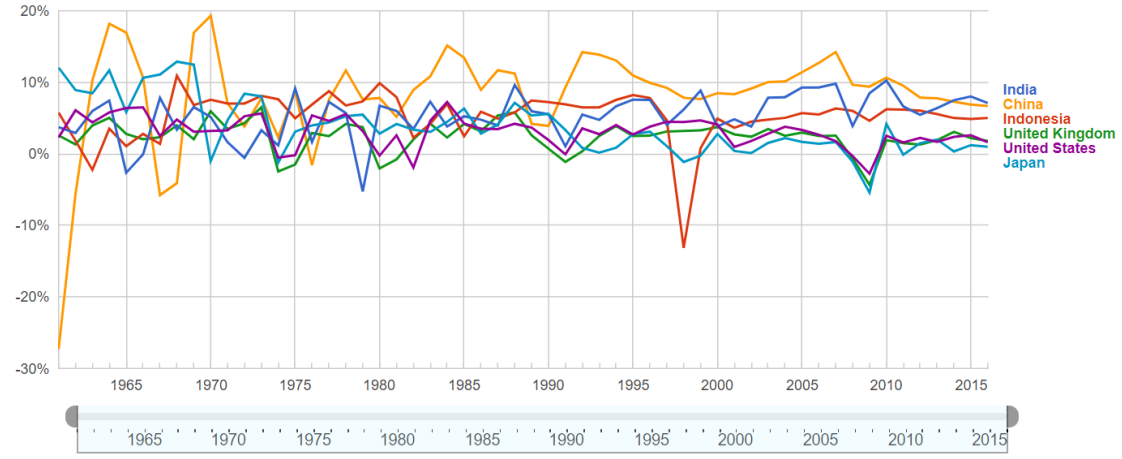
1.5.1 Brief History of Indonesia

To simplify the long history from the 7th century, Indonesia could be divided into three time periods which are major empires era, colonialization era, and post independence - development era. Overall, it will be shown how important it is to have power over the Indonesian seas and concentration at Java Island.

During the major empires' era, there were quite many empires in the islands of Indonesia with different religious background which was Hindu-Budhist then followed by Muslim empires. Two of the most famous Hindu-Budhist empire are *Srivijaya* and *Majapahit*. The former existed in the 7th to 12th century, controlled around southern of Thailand to Central Java with the centre of power located in Palembang (one of Indonesia's largest river port now in South Sumatra Province).

Meanwhile, the latter existed in the 13th to early 15th century, controlled around western parts of Malaysia to West Nusa Tenggara with the centre of power located in Mojokerto (now East Java Province). These two empires were South-East Asian empires famous for its maritime powers. Ports under *Srivijaya's* control were favoured ports of call because it has a strategic location, 'vibrant commerce', highly developed port, shipping and shipbuilding infrastructure (Sakhuja 2011, p.262). Scholars claimed the Majapahit Empire's territory covered present-day Indonesia and parts of Malaysia, which can be seen in Figure 1.7.

GDP Growth Rate (%)



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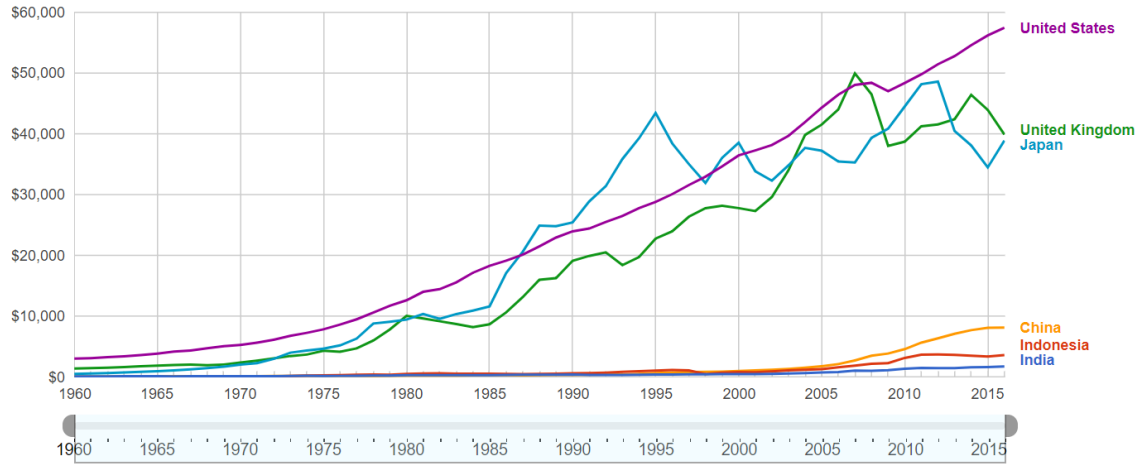
GDP per capita (current US$)



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Source: Unknown (2008), World Bank (2018)

Figure 1.6 Indonesia's Main Islands and Economic Indicators

Source: Kartapranata (2009a)

Source: Kartapranata (2009b)

Figure 1.7 Territory of Srivijaya Empire (left) and Majapahit Empire (right)

Next, Muslim empires were established after the fall of Hindu-Budhist empires, scattered in various islands. Even Java island was ruled by various Muslim kingdoms (Suhardy 2015). Islam religion itself was introduced to the archipelago by trade, which was long before significant Indonesian conversion began (Ricklefs 1981; Suhardy 2015). Ricklefs (1981) mentioned that Indonesia's contact to Islam is 'inconceivable' without trade and commerce to international network, specifically from northwest and southwest India, southeast India, Bengal, South China, Arabia, Egypt and Persia. Since Indonesia now has the world's largest population of Muslims, it is seen how Indonesian islands long ago were open to international trade.

The Indonesian archipelago was also supported by the existance of Malacca (today Malaka strait). During the decline of *Majapahit* in the early 15th century, a prince of Palembang named Parameswara fled and built Malacca (Ricklefs 1981). He established Malacca as a major international port, attracted ships to call with fair trade and reliable warehousing facilities. Malacca expanded Indonesian archipelago's trade further to Syria, Mediterranean, East Africa, Siam, China and Japan (Ricklefs 1981). Portugese writer at that time, Tome Pires, mentioned that Malacca had an impressive wealth with the main 'prize products' traded were spices of Indonesia, Javanese rice and Indian textiles (Ricklefs 1981).

Indonesian spices then became famous, attracted Western countries to see and obtain these products by themselves which started the Colonialization Era. Europeans arrived in Southeast Asia at the beginning of 16th century, lead by the Portugese because they were the first to advance in shipping technology and navigation (Ricklefs 1981, p.20). They were searching for the 'Spice Islands' with its most valuable products clove, nutmeg and pepper. Price of these products increased accordingly the further they are sold to the west (Vlekke

1946; Burnet 2013). Portugese conquest Malacca, spread Christianity and also went to conquest Amboina / Moluccas archipelago in the Eastern part of Indonesian archipelago (today Maluku) which is the central production of these spices (Ricklefs 1981).

The Dutch followed the Portugese's aspiration and strategy, however, with better organisation, ships and financial support. They arrived at the end of the 16th century. Their strength was their establishment of Java Island as permanent foothold, centre of control and plantation production (Vlekke 1946; Ricklefs 1981). The Indonesia archipelago was then made by the Dutch to become a huge profitable company, known as Netherlands East Indies (*Verenigde Oost-Indische Compagnie* - VOC in Dutch) (Vlekke 1946; Ricklefs 1981; Vickers 2013).

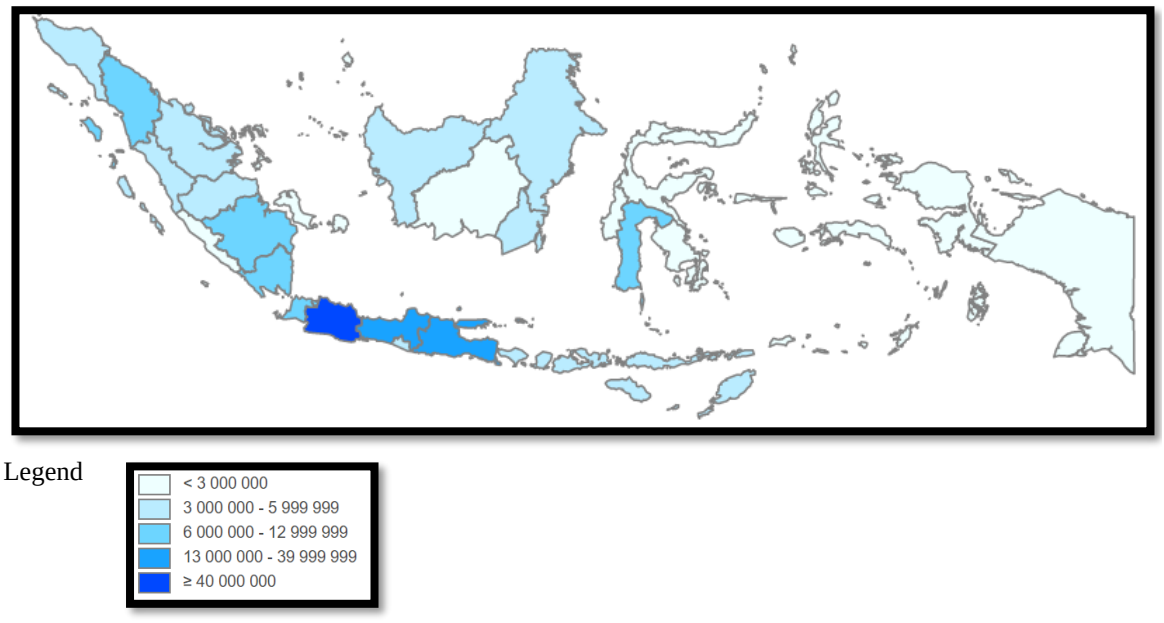
The Dutch's trading and settlement were focused on Java Island because it provides good soils and large areas of gentle topography for agriculture (Hardjono 1983). Hardjono (1983) described developments done by the Dutch includes compulsory cultivation of commercial crops and supplying raw materials for Holland industries, however, it did not benefit much to the Indonesian population. The pattern of this development and population growth then continues to create disparity between Java and the other islands. Hoyle et al. (1998) also supported that Dutch's spatial focus leads to a strong centre-peripheray contrast in Indonesia's development pattern. There are also other colonies by other developed countries across the world in various parts of Indonesia, however, Dutch control was the largest and longest period.

Colonialisation occurred for around 200 years until Indonesia's fight for independence succeeded on 17th August 1945. At the end of the 18th century, the population of Java island was approximately 3 million which was considered extremely underpopulated by 20th century standards (Ricklefs 1981, p.14). By the end of 1950s, Java's population reached aroud 50.5 million which is 65% of Indonesia's population of approximately 77.2 million people (CICRED 1974, p.10). It is seen how Indonesia's population is very crowded in Java Island. Colonialisation not only brought concentration of population in Java Island, it also established development and basic infrastructure in Java Island with its centre in Batavia (today Jakarta).

Lastly, in the post independence and development era. Indonesia has 7 presidents so far and each president has unique development planning. The first president (in power 1945-1967), Ir. Soekarno, was the founding father of Indonesia who lead efforts to gain independence.

Second president Soeharto (in power 1967-1998) is known as the father of development, who succeeded to build basic infrastructure (although still dominated by land development) and reach self-sufficiency in rice production. The third president Ir. Baharuddin Jusuf Habibie (in power 1998-1999) is known as improving Indonesia's aviation production industry. The next two presidents, Abdurrahman Wahid and Megawati Soekarno Putri (in power 1999-2004) are known for improving pluralism and stabilising economic conditions caused by 1998 crisis.

The sixth president Susilo Bambang Yudhoyono (in power 2004-2014) is known for improving democracy, distribution of development (not only in Java Island) and reduce foreign debt down to 23% of GDP. Lastly, president Joko Widodo (in power 2014 to today) aims to build more infrastructure across the country and improve the maritime sector. Nowadays Java Island, centre of Indonesia's economy and population, is home of approximately 57% of Indonesians in recent data 2016. Indonesia's population in 2010 census is described in Figure 1.8 (census is conducted every 10 years). Imbalanced population, development and economic growth in Indonesian archipelago are still a challenging problem until today.



Source: Central Bureau of Statistics Indonesia (2010)

Figure 1.8 Indonesia's Population in Census 2010

1.5.2 Indonesia's Maritime Transport Industry

Main Ports

Indonesia has 111 commercial ports (Ministry of Transportation Republic of Indonesia 2009b). The ports of Indonesia are operated by 4 state owned companies. After Indonesia's independence in 1945, all port infrastructure was owned by the government. They were formalised in 1960 when the government established four state owned port companies as operators, which are: *Pelabuhan Indonesia I* (*Pelindo I*), *Pelabuhan Indonesia II* (*Pelindo II* or Indonesia Port Corporations / IPC), *Pelabuhan Indonesia III* (*Pelindo III*), and *Pelabuhan Indonesia IV* (*Pelindo VI*) (IPC 2012a).

The word *'Pelabuhan'* is the Indonesian language for port. Each port company represent a certain geographical location. Pelindo I operate in the most western part of Indonesia, with Belawan port as its largest port located in city of Medan, North Sumatra province. Pelindo II operates in the central part, with Tanjung Priok as its largest port located in the capital city of Jakarta. Pelindo III operates in the mid-eastern part with Tanjung Perak as its largest port located in Surabaya, East Java province. Lastly, Pelindo IV operates in the eastern part with its largest port, Makassar port, located in Makassar, South Sulawesi province. Their geographical position is shown in Figure 1.9.

In 1917, Jakarta and Surabaya were already inserted in the global shipping network of a Japanese leading shipping company (Appendix 4). However, Indonesia's containerisation was relatively late compared to Singapore. While Singapore was already the 6th largest container port in the world in 1980; 75% of containers carried to Indonesia are discharged at Tanjung Priok and Indonesia was perceived to be in the 'outer boundaries' of containerisation (Smith 1981). Only Jakarta was prepared to accept containers and connect to Singapore at that time (Smith 1981). In 1985, Belawan and Surabaya started to be connected to Singapore by feeder ships, as mentioned in Containerisation International 1985 that a huge array of feeder services are emerging, operating out of Singapore to Malaysia, Thailand and Indonesia's ports (Matthews 1985b). A trunk-feeder system was also initiated in the 1980s, hence, Jakarta, Surabaya, Makassar and Belawan became major export outlets or 'gateways' for Indonesia (Hoyle et al. 1998).

Source: Lino (2012)

Figure 1.9 Major Ports in Indonesia

Port of Tanjung Priok, in North Jakarta, is the largest and busiest port in Indonesia until today. It handles more than 30% of non-oil and gas commodities, and handles 50% of cargoes coming in and out of the country, which makes this port a 'barometer' of Indonesia's economy (IPC 2012b). Tanjung Priok is the world's 21st largest container port in 2014 with a throughput of 6,590,000 TEU in 2013 (Brett 2015). Meanwhile, Surabaya's Tanjung Perak port is the world's 47th largest container port with a throughput of 3,001,169 TEU in the same year. Surabaya itself is the second largest city in Indonesia after Jakarta.

Consistent with Tanjung Priok as Indonesia's largest port, IPC is also the largest port operator. Among the 4 port operating companies, IPC handles 75.1% of container cargo, followed by Pelindo III which handles 11.1%. A deconcentration trend is seen because there is a reduction in IPC's market share becoming 64.8% and a rise in Pelindo III becoming 23.1% in 2013. The percentage of cargo handled by port operators in Indonesia is detailed in Table 1.3.

Table 1.3 Percentage of Cargo Handled by Port Operators in Indonesia

State owned Port Operators in Indonesia	Cargo (Tons)		Container (TEU)	
	% in 2011	% in 2013	% in 2011	% in 2013
Pelabuhan Indonesia I (Pelindo I)	24.3	25.1	9.3	7.5
Pelabuhan Indonesia II (Pelindo II or IPC)	43.3	49.3	75.1	64.8
Pelabuhan Indonesia III (Pelindo III)	29.6	22.8	11.1	23.1
Pelabuhan Indonesia IV (Pelindo IV)	2.8	2.9	4.6	4.6
Total	100.0	100.0	100	100.0

Source: calculalted by Author, data from (IPC 2011; Pelindo I 2011; Pelindo III 2011; Pelindo IV 2011; Pelindo I 2013; Pelindo III 2013; IPC 2014; Pelindo IV 2014)

However, according to total cargo handled - loaded and unloaded - in the 5 main Indonesian ports, Surabaya's position is in third place after Jakarta and Balikpapan. This secondary data on cargo handled in tons, not only container cargo, is obtainded from the Central Bureau of Statistics Indonesia (2018). Applying Herfindahl-Hirschman Index (HHI) formula to the throughput data of 5 main Indonesian ports, it is seen that the score is near 0.2. This means that the market share is divided equally between all five ports, or more deconcentration. HH Index is a measurement to capture the asymmetry of market shares (Calkins 1983 in Pham 2016), which will be explained further in Section 2.2.2. Total cargo loaded-unloaded and HHI for 5 main Indonesian ports from 2006 to 2017 are described in Figure 1.10.

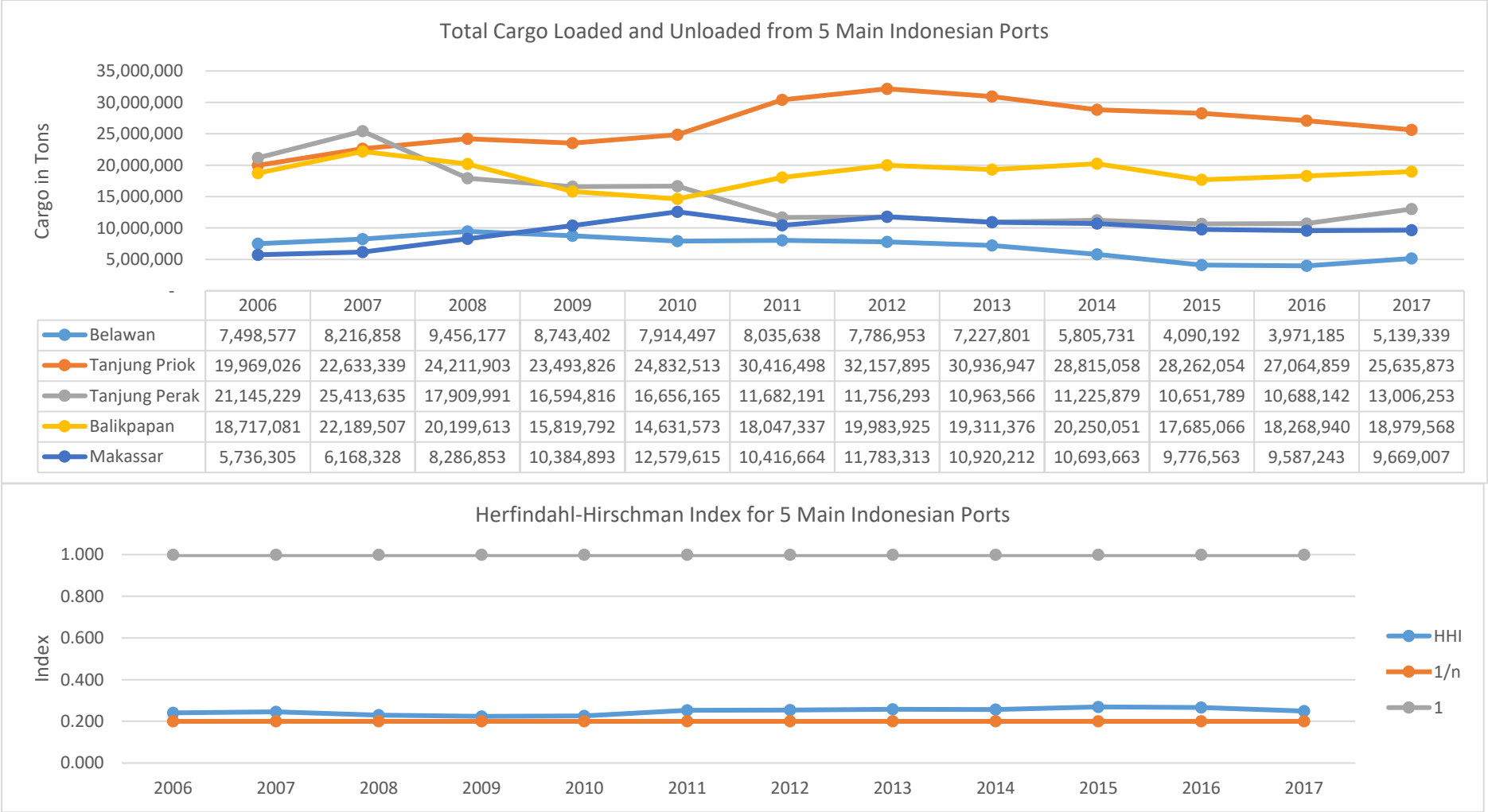
Port and Shipping Policies

Indonesia's Port Authority was not established until 2008. After the issue of Act no.17 year 2008 on Shipping, the function of port authority (i.e. regulator) and port operator is separated. After this act was implemented, the Pelindos' are allowed to develop ports or

expand their business outside their authorised location mapped in Figure 1.9. Act no 17 year 2008 is updated in Government Regulation PP no. 61 year 2009 on Port Affairs and Ministerial Decree from the Ministry of Transport No. KP 901 year 2016 on National Port Masterplan. The Government regulation on Port Affairs provides categories of ports in Indonesia's maritime transport sector, which also shows the existence of a port hierarchy. There are three level in the port hierarchy which are: Main Port (*Pelabuhan Utama),* Collector Port (*Pelabuhan Pengumpul)* and Feeder Port (*Pelabuhan Pengumpan).* The following Table 1.4 explains parts of the Government Regulation PP no. 61 year 2009 related to port hierarchy.

The Government regulation on Port Affairs explains that the function of Main Ports stresses on handling international cargo, while the rest to handle domestic cargo. The categories in the port hierarchy are also based on the port throughput and port infrastructure, with Main Ports handling larger throughput and having more sophisticated infrastructure. Feeder ports are broken down into regional and local feeder, which shows a differentiation in serving city and district level. Moreover, it is shown in Table 1.4 that the government regulations are based on certain factors to determine the port's location and level in the port hierarchy, such as close to shipping routes and has enough land for port expansion. Port development in practice is complicated because it requires bureaucratic steps to be fulfilled regarding spatial or town planning laws and related Ministries (Many 2018). Many (2018) explained in her study that the Port of Belawan needs to conform with Medan City Regulation, North Sumatra Provincial Spatial Plan, Sumatra Island Spatial Plan, National Spatial Plan, as well as the Spatial Law. Furthermore, port development also needs approval from more parties such as Ministry of Transport, Ministry of Environmental Affairs, Ministry of National Development Planning, Coordinating Ministry of Economic Affairs, Coordinating Ministry of Maritime Affairs, etc.

However, it is not impossible for a port to be developed and upgrade its position in the port hierarchy. It is explained in the National Port Masterplan (NPM) that the port hierarchy could change and improve. It stated, *"Port status will be reviewed continuously, to determine the chances of having a change in port hierarchy and its implication on revising the NPM and other individual port masterplan"* (Ministry of Transportation Republic of Indonesia 2009a, p.6). Total number of ports in the port hierarchy and its changing status in certain years are described in Table 1.5. The number shows that there is a large proportion of collector ports and there is a gradual upgrade of ports in the hierarchy.



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Belawan	7,498,577	8,216,858	9,456,177	8,743,402	7,914,497	8,035,638	7,786,953	7,227,801	5,805,731	4,090,192	3,971,185	5,139,339
Tanjung Priok	19,969,026	22,633,339	24,211,903	23,493,826	24,832,513	30,416,498	32,157,895	30,936,947	28,815,058	28,262,054	27,064,859	25,635,873
Tanjung Perak	21,145,229	25,413,635	17,909,991	16,594,816	16,656,165	11,682,191	11,756,293	10,963,566	11,225,879	10,651,789	10,688,142	13,006,253
Balikpapan	18,717,081	22,189,507	20,199,613	15,819,792	14,631,573	18,047,337	19,983,925	19,311,376	20,250,051	17,685,066	18,268,940	18,979,568
Makassar	5,736,305	6,168,328	8,286,853	10,384,893	12,579,615	10,416,664	11,783,313	10,920,212	10,693,663	9,776,563	9,587,243	9,669,007

Source: calculated by Author, data from Central Bureau of Statistics Indonesia (2018)

Figure 1.10 Total Cargo Loaded - Unloaded in Tons and Herfindahl-Hirschman Index from 5 Main Indonesian Ports

Table 1.4 Port Hierarchy in Indonesia in Government Regulation PP no. 61 year 2009

Article	Content		
Article 6	Types of ports are seaport, river port, and lake port. Types of port based on its function are for sea cargo and passenger crossing. Three main hierarchy of ports are Main Port (*Pelabuhan Utama),* Collector Port (*Pelabuhan Pengumpul)* and Feeder Port (*Pelabuhan Pengumpan).*		
Article 7	Port National Masterplan as guidelines for determining location, development, operations and expansion of port. The time frame is for long term planning.		
Article 8	Port National Masterplan is implemented for 20 years, reviewed once every 5 years or more if natural disaster occurs.		
Article 9	Port National Masterplan includes port policy and expansion/development planning for existing and new ports.		
Article 10	Location for port development should consider: a) national spatial plan, provincial spatial plan, and district / city spatial plan; b) potential and regional socio-economic development; c) the potential of natural resources; and d) the development of strategic environments, both nationally and internationally.		
Article 11-13	Location of a port is determined by the following aspects:		
	For Main Port	For Collector Port	For Feeder Port
	Article 11 a) close to geographic distance with International market; b) close to international shipping routes; c) has a certain distance with other main ports; d) has a certain area of land and waters, also protected from waves; e) able to serve ships with certain sizes; f) function as a transhipment for International cargo and ship passenger; g) has a certain volume of cargo loading-unloading.	Article 12 a) Government policy related to reduce inequality in development and increase regional growth; b) has a certain distance with other collector ports; c) has a certain distance with domestic shipping routes; d) has a certain area of land and waters, also protected from waves; e) near to regional growth centre in provincial and national level; f) able to serve ships with certain sizes; g) has a certain volume of cargo loading-unloading.	Article 13 a) provincial spatial plan and policy related to reduce inequality in development between provinces; b) city/district spatial plan and policy related to reduce inequality in development between cities/districts; c) near to regional growth centre in city/district level; d) has a certain distance with other feeder ports; e) has a certain area of land and waters; f) serve cargo and passenger between cities/districts or in one city/district; g) able to serve ships.

Sourece: Republic of Indonesia (2009)

Table 1.5 Total Number of Ports in the Port Hierarchy in Indonesia's National Port Masterplan

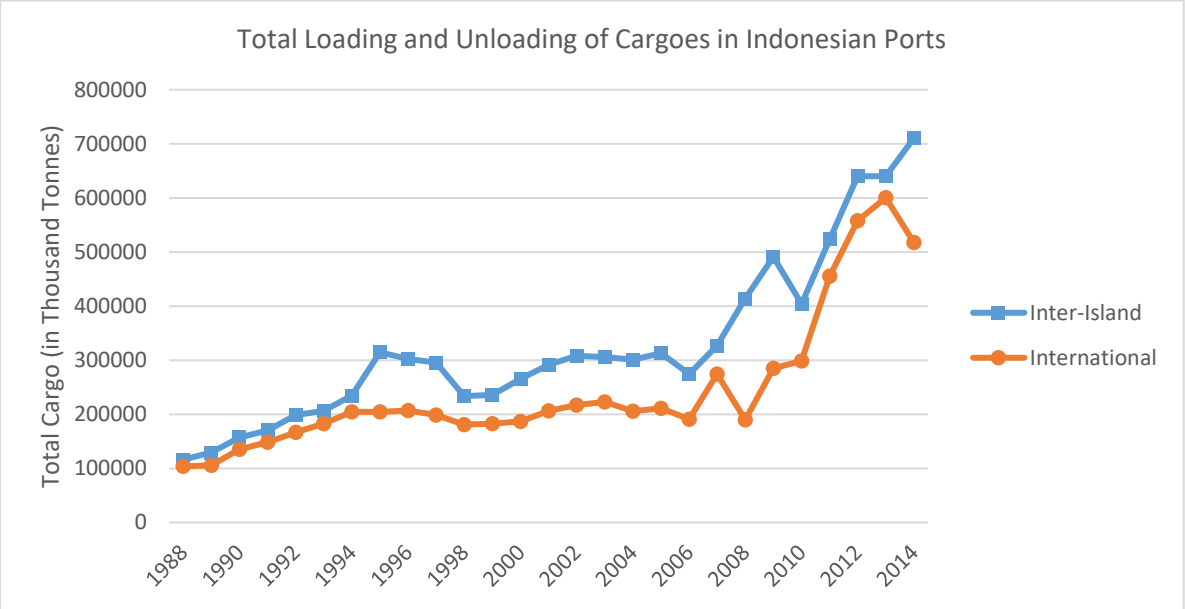
Port Level in National Port Masterplan	Total of Ports			
	2011	2015	2020	2030
Main Port	26	28	29	30
Collector Port	167	181	186	185
Feeder Port Regional	115	105	103	103
Feeder Port Local	32	26	22	22
TOTAL	340	340	340	340

Source: Ministry of Transportation Republic of Indonesia (2009a)

Shipping and Cabotage Law

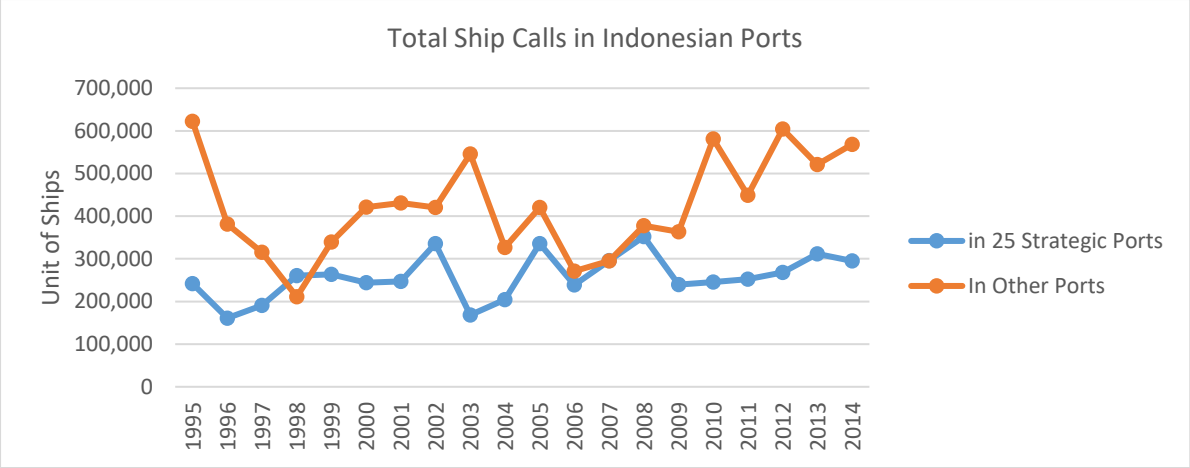
Indonesia's maritime transport industry has a larger portion of inter-island cargo compared to international cargo. Furthermore, there is a larger portion of ship calls in non-strategic ports compared to 25 strategic ports. This shows that there are many smaller ships serving non-strategic ports and that domestic cargo is more dominant. Total loading and unloading

of cargoes in Indonesian ports is described in Figure 1.11, while total ship calls in Indonesian ports are described in Figure 1.12. Shipping companies in Indonesia are private sectors, however, there is one state-owned shipping company named PT. Pelni (Persero) which is subsidised by the government for its operations. They provide 'pioneer' shipping services with routes to peripheral ports, especially in Eastern Indonesia.



Source: Central Bureau of Statistics Indonesia (2017a)

Figure 1.11 Total Loading and Unloading of Cargoes in Indonesian Ports



Source: Central Bureau of Statistics Indonesia (2017b)

Figure 1.12 Total Ship Calls in Indonesian Ports

Indonesia has a cabotage law to support its domestic shipping industry. Similar to China and the Russian Federation, Indonesia has a large number of nationally flagged and owned ships which operates in coastal or inter-island shipping, smaller size than ships on international routes, to be protected from foreign competition and do not necessarily fall under global IMO regulations (UNCTAD 2015). Hence, international shipping lines must have an

Indonesian company representative to be able to operate in Indonesian waters. Indonesian waters have an Exclusive Economic Zone (EEZ). Declared on the 21st March 1980, it is stated that the boundary of territorial waters is 12 miles of sea from the outermost land area plus Exclusive Economic Zone as far as 200 miles (President of the Republic of Indonesia 2012). The National Logistics Development Blueprint (SISLOGNAS) explains that due to the existence of EEZ, Indonesia's territory is defined into Front Territory (*wilayah depan*) and Internal Territory (*wilayah dalam*)(President of the Republic of Indonesia 2012). These two territories are described in Figure 1.13.

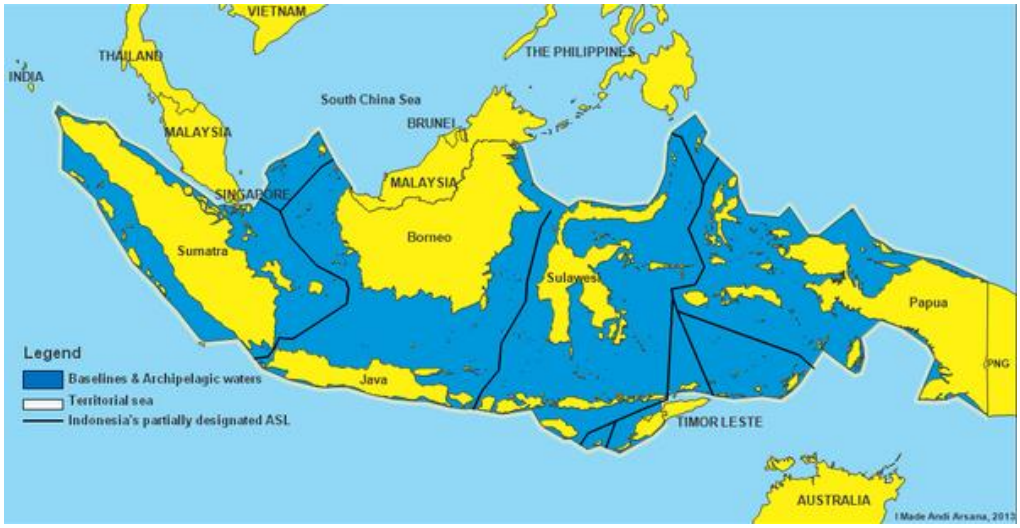
Source: President of the Republic of Indonesia (2012, p.75)

Figure 1.13 Indonesia's Front and Internal Territory

Indonesia's cabotage law has once been relaxed by the Indonesian government in 1985 (Matthews 1985a). The government gave 'relaxed' shipping policy in 1985 for foreign shippers to go directly to Indonesia, which aims to reduce shipping cost (Containerisation International 1985). However, in 2005 the cabotage law was re-implemented to protect the national ship building industry (Dick 2008). More explanations on cabotage law and the changing policies in Indonesia's maritime transport can be seen in (Dick 2008), where he argues that there is an ongoing conflict or trade off in the Indonesian government between protectionism/rent-seeking and development. More recent study by Organization for Economic Cooperation and Development (OECD) found that Indonesia should relax restrictions on cabotage to increase direct calls by shipping lines on major trade lanes and increase attractiveness of Indonesian ports (Mooney 2018).

Besides cabotage law, Indonesian waters also has Archipelagic Sea Lanes (ASL). These are based on Article 53 in United Nations Convention on the Law of the Sea (UNCLOS) that archipelagic nations are allowed, but not obliged to have them (Arsana 2015). Currently

Indonesia has 3 ASLs from the north to the south, represented by the black lines in Figure 1.14, which is not yet approved by the International Maritime Organisation (IMO) because more lanes are expected to connect the west and east (Arsana 2015).



Source: Arsana (2015)

Figure 1.14 Indonesia's Archipelagic Sea Lanes

1.5.3 Development of Rural Regions and Eastern Indonesia

Development of Rural Regions

In the field of Planning and Development, less developed areas are concerned with rural development. In the 1950s and 1960s, the manufacturing and industrial sector were used to increase productivity and income per capita made by policy makers (Lea and Chaudhri 1983). This generally benefitted the rich and local elites, and did not 'trickle down' to the poor, increased gaps between the rich and the poor and created dependency relationships with urban centres (Lea and Chaudhri 1983). By the mid-1970s, a new approach for development emerged as rural development. It is recognised that infrastructure contributes to productive activities, and of the important infrastructure is transportation (Youngson 1967 cited in Lea and Chaudhri 1983). Furthermore, the state or government in developed countries increasingly has a larger role to intervene in the provision of public goods and infrastructure, while governments in developing countries hold the key role of initiating and facilitating development (Lea and Chaudhri 1983).

On the other hand, in transportation sector, ports are one of the important infrastructures in transportation which contribute to economic development, especially for developing countries (Nagorski 1972). Peripheral ports should be no exception. Rural and national development programs in Indonesia since early independence in the 1950s up to 1990s did not focused on sea transportation (See Hardjono 1983). Programmes for rural development

were more concerned with the establishment of co-operatives, land reform, assistance for farmers to become self-sufficiency (mostly on rice) and resettlement or transmigration program to decrease the over populated Java island and to provide labour to the other less developed islands (Hardjono 1983). It is indeed a complicated and difficult task to develop rural regions and its transport at the same time. Hoyle et al. (1998, p.46) even stated that *"Nowhere is there a more conspicuous example of the real dilemma of satisfying regional and structural needs from limited sources."* Hoyle et al. (1998) added that Indonesia's transport sector has responded to critical needs seen from its mergence as one of the more dynamic economies in ASEAN. However, economic inequality is still a big challenge until today. Oxam reports stated that the gap between rich and poor has grown faster in Indonesia than in any other ASEAN countries (Irham 2017).

Eastern Indonesia

As of today, the percentage of poverty in Eastern Indonesia is higher than in the Western part, also higher in the rural compared to cities across provinces (Solihin 2018). Indonesia has more than 28 million people still living below the national poverty line, where Papua Province and West Papua Province have poverty rates twice the national average (UNDP 2018). In terms of education, the regencies and cities in Papua has basic education facilities, teachers and enrolment rates below national standards (Effendy 2015). Efforts to reduce poverty and provide basic education becomes more difficult because of the geographic condition in Papua which is mountainous (Gordon et al. 2006).

In terms of transport, Indonesia's domestic cargo distribution are mainly concentrated in the west and central region (Indonesia Port Corporations 2012). Hence, it creates imbalance and products reach the east region with higher logistic cost. As an example, the cost to ship a container from Jakarta to Ambon (one of the city in east region with a distance of ±2,000 km), is about twice the cost to ship from Jakarta to Hamburg, which is ±11,000 km approximately five times the distance of Jakarta and Ambon (Indonesia Port Corporations 2012). Today, shipping lines' routes to serve Eastern Indonesia are very much dependent on Surabaya as seen in Figure 1.15 (Marei and Ducruet 2016). This is explained in the work by Ducruet et al. (2011) and Marei and Ducruet (2016) using Graph Network Analysis. They found that less central ports, including Surabaya and Jakarta, are growing faster because of large ports' limitations, shipping lines' strategy in Asia and public investments in port expansion projects (Ducruet et al. 2011). They calculated maritime degree and betweenness

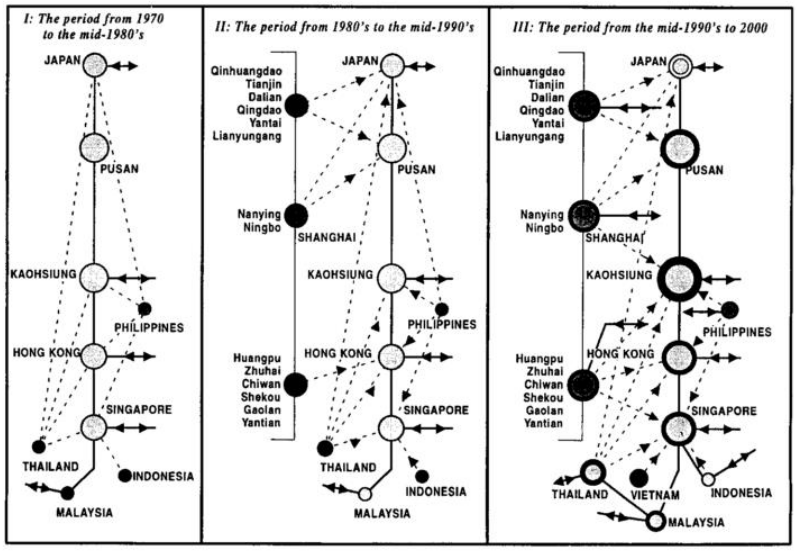
centrality for each port, then compared results from 1996 and 2006 data. They stated in detail about Surabaya as follows:

> *"In 2006, the impact of local port development in Indonesia is more visible, notably through the strikingly high centrality of Surabaya. This may be explained by rapid growth in inter-island shipping within East Indonesia for which Tanjung Perak (Surabaya) is the main hub, based on ambitious local development of port terminals and industrial districts"* (Ducruet et al. 2011, p.7).

Studies on maritime network from the 1970s up to 2011, as shown in Figure 1.16 shows that for a long period of time, Jakarta and Surabaya have been feeder ports under the large hub of Singapore. In more recent publications, Mooney (2018) argued that there is a significant volume of export cargo handled by Eastern Indonesia's secondary ports which are currently transshipped via Singapore, such as from Bitung in North Sulawesi, Makassar in South Sulawesi, Sorong in West Papua. Statistics Bureau stated that Indonesia's economic growth in 2017 GDP is 5.07% and growth is positive across all regions (Setiawan 2018).

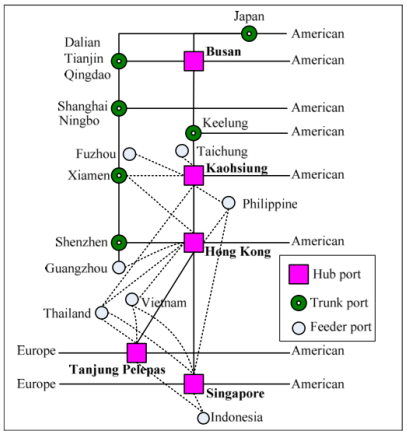
When they are broken down spatially by islands, it shows that Java Island contributes up to 58%, followed by Sumatra Island 21%, Kalimantan Island 8.2% and Sulawesi Island by 6%. The rest of the islands contributes only 5.5%, which includes Papua Island of only 2.4% (Setiawan 2018). In terms of GDP growth in percentage by islands, Sulawesi Island has the highest growth which is 6.9, followed by Java Island 5.6%, Maluku and Papua Islands 4.89%, Kalimantan 4.3% and Bali-Nusa Tenggara Islands 3.7% (Setiawan 2018). Despite its economic conditions, Eastern Indonesian waters are well known for its Skipjack and Yellowfin tuna, which are two among the best commodities that Indonesia provides to world market (Harsono and Damanik 2017). Those two are commonly found in Halmahera *Eddy* (warm pool) which contributes to 40% world tuna production, more than 1.5 million tonnes per year (Harsono and Damanik 2017, p.5). The Ministry of Fisheries and Indonesian Navy has been struggling to manage the conflict with surrounding nations about the illegal fisheries (Harsono and Damanik 2017, pp.100-102). The small number of fishing ports in east Indonesia is also a problem, there are only 7% out of 1375 fishing ports (Harsono and Damanik 2017, p.113-114). Harsono and Damanik (2017) argued the need to open one big central fishing port in Easten Indonesia to be able to process all the catch from Halmahera, shorten the production chain and establish Indonesia's first big cold storage to support the Eastern Indonesian hub.

1970 to 2000 data



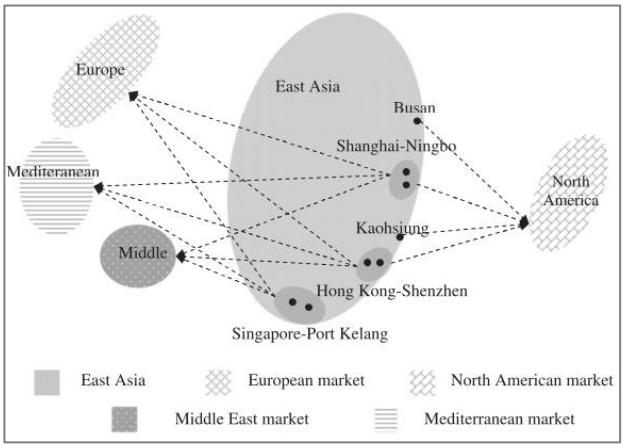
Source: Robinson (1998, p.36)

2005 data



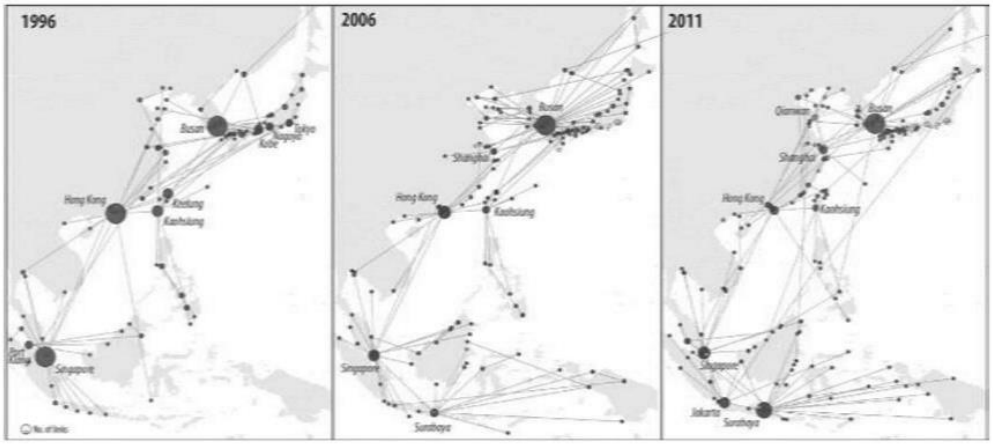
Source: Huang et al. (2008, p.20)

2009 data



Source: Cullinane and Wang (2012, p.179)

1996, 2006 and 2011 data



Source: Marei and Ducruet (2016, p.341)

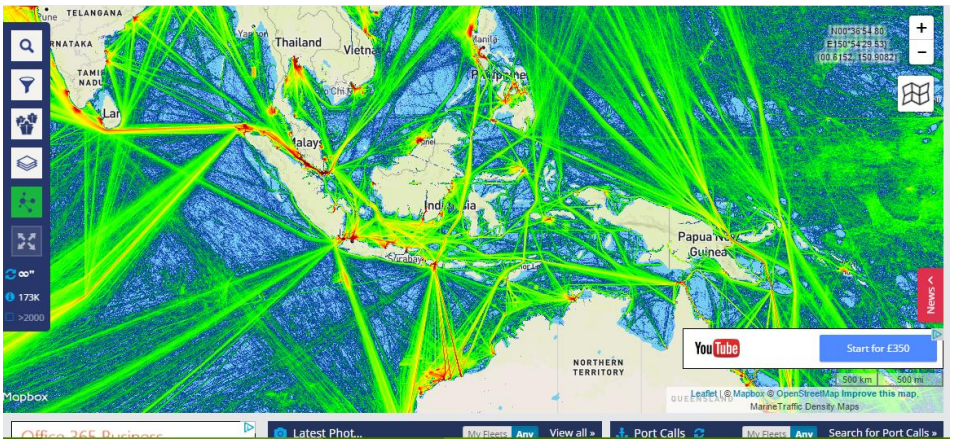
Figure 1.15 Indonesia's Position in the Global Maritime Network

1.5.4 Indonesian Ports in the Global Market

Indonesia's Trade and Position in the Global Market

Indonesia's largest and long-term trading partners are Japan and the USA, however, there is a decreasing trend because of its increased trade with China (Wiradanti et al. 2016). In terms of geographical condition, the shift from Japan to China as main trading partner does not have a big impact for transportation because their position is north to Indonesia. However, Wiradanti et al. (2016) argued that the China effect is also seen in Indonesia from its volume growth, which accelerates growth of trade and port throughput especially in Tanjung Priok. The rising trend is also seen by the existence of port capacity expansion projects and global investors coming in to catch up with the growth of cargo. According to rankings in the World Bank's Logistic Performance Indicator (LPI), Indonesia is one of the top 10 lower middle-income performers throughout 2010 to 2014 (Arvis et al. 2014, pp.8-9).

Indonesia's position between Asia and Australia is strategic, however, it is taken for granted. Compared with the Mediterranean and the Caribbean, Asia's maritime network has a high share in intra-regional traffic (Marei and Ducruet 2016). Hence, Indonesian ports has opportunities to increase its shipping connections. However, Tanjung Pelepas is the main hub which connects ships between East Asia and Australia/New Zealand (Fremont 2007). Besides Tanjung Pelepas, ships directly go through Papua New Guinea. Indonesia described in a live and real-time global shipping movements can be seen in Figure 1.16.



Source: (https://www.marinetraffic.com), accessed in 2016, color near to red indicates more density

Figure 1.16 Indonesia's Position in Live and Real-Time Global Shipping Movement

Indonesia as Member of ASEAN

Indonesia is part of The Association of South East Asian Nations (ASEAN), a regional economic group, with other members comprise of Brunei, Cambodia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam. In August 2007, ASEAN

launched a logistics development policy (Banomyong et al. 2008). The objective of these initiatives was to create an ASEAN single market by 2015 and improve logistics to support the competitiveness of ASEAN products (Banomyong et al. 2008). The process of writing the policy is supported by a survey which assess the capacity of all logistics-related sectors in each of the ASEAN member countries. Banomyong et al. (2008) described that survey questions includes asking about customs, ports and maritime transport, rail, road, inland waterway, air transport and logistics services. Their survey revealed that each member countries has different levels of logistics capacity caused by different levels of economic development (Banomyong et al. 2008).

In the global containerised trade, developing countries continues to expand its container ports to cope with demand, including 3 large ASEAN countries Singapore, Malaysia and Indonesia. In 2014, global containerized trade increased by 5.3% and reached 171 million TEUs, which made Indonesia in the 8th position of developing countries based on container port throughput (UNCTAD 2015, p.19). Table 5 in Appendix 1 shows a list of the top 10 developing countries and their container throughput in 2012 to 2014. Most of the developing countries (7 out of 10) experience higher growth in their container port throughput compared to the global containerized trade. However, according to Liner Shipping Connectivity Index (explained further in Section 2.2.4), Indonesia (score 27.19) is far behind Singapore (score 122.7) and Malaysia (score 106.79) in 2016 (UNCTAD 2017). Other recent 'hot topic' in ASEAN's transport sector is the development of Isthmus Kra and China's One Belt One Road (OBOR). The development of Isthmus Kra in Thailand will enable ships from the Far East to Europe without going through Singapore. Meanwhile, OBOR is a huge development and investment project by the Chinese government to strenghthen transport connectivity with its trading partners.

1.6 Summary

This research aims to explore how a container hub port in a peripheral location could capture opportunities of growth and identify factors for a peripheral port to reduce its peripherality by becoming a hub. In addition, Indonesia as the context of the research has its unique characteristics. Indonesia is considered a suitable context for the research aim since it has hub ports, peripheral ports and interaction between them in one country scope. The following is a review of literature as beginning of the journey in learning about peripheral and hub ports.

Chapter 2

Literature Review: Peripheral Ports, Hub Ports, Stakeholders in Maritime Economics & Willingness to Invest

"I have often noticed that nationalism is at its strongest at the periphery. Hitler was Austrian, Bonaparte Corsican. In postwar Greece and Turkey the two most prominent ultra-right nationalists had both been born in Cyprus. The most extreme Irish Republicans are in Belfast and Derry (and Boston and New York). Sun Yat Sen, father of Chinese nationalism, was from Hong Kong. The Serbian extremists Milosevic and Karadzic were from Montenegro and their most incendiary Croat counterparts in the Ustashe tended to hail from the frontier land of Western Herzegovina" (Hitchens 2010, p.193)

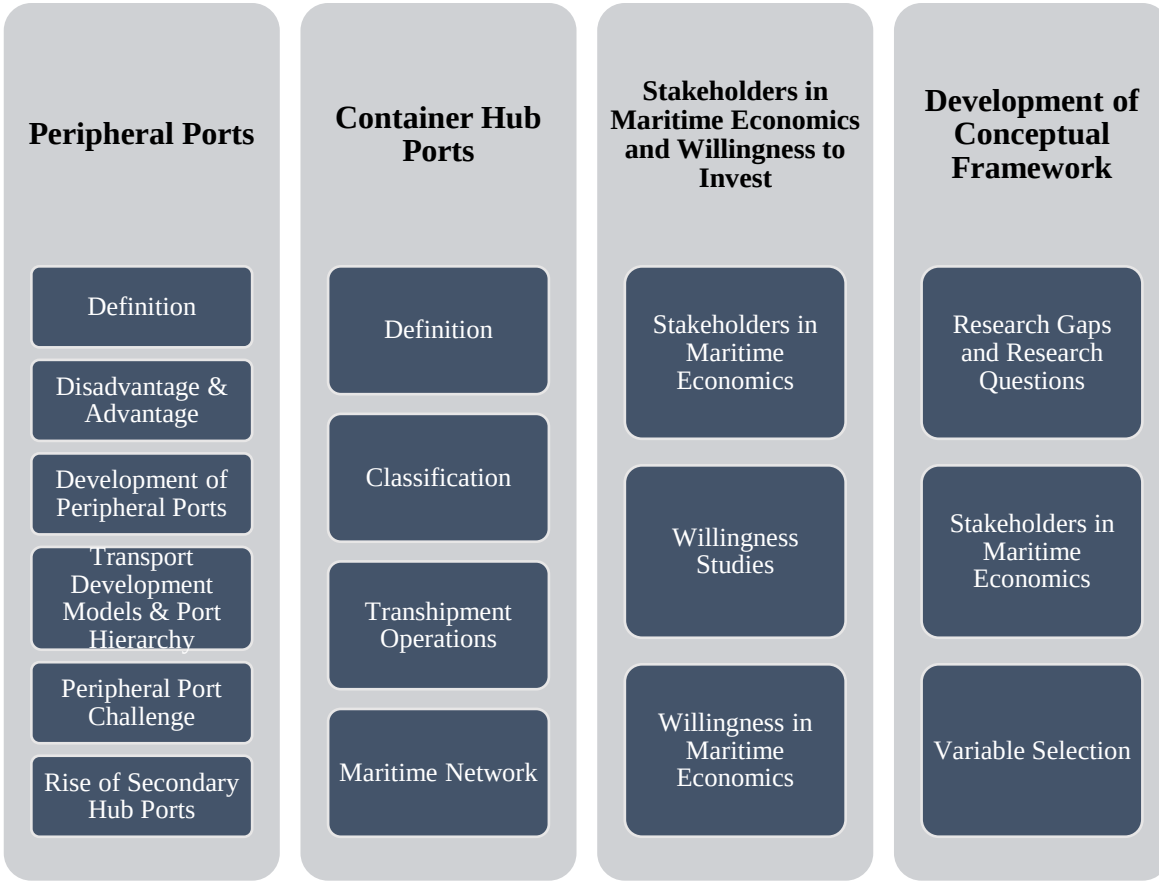
The previous chapter provided an introduction for this Thesis covering background, research aim, research questions, research domain, overview of methodology and research context on Indonesia. In this chapter, an in-depth literature review is conducted which focuses on the important keywords of this research. A literature review has multiple purposes, which are as follows: providing historical background and context to identify the position of the research; explaining relevant terminology or definitions; discussing theories, concepts also the work of other researchers that are related; and lastly identifying and tackling the research gap which shows the significance of our research (Ridley 2008). Thus, this chapter aims to address these purposes.

There are primarily three types of literature review which are narrative/traditional reviews, qualitative systematic reviews, and quantitative systematic reviews (meta-analyses/meta-synthesis) (Green et al. 2006; Cronin et al. 2008). Systematic reviews were originally used in medical science research, which uses specific and detailed protocols to identify, select and assess the literature. The use of systematic reviews in Management field provides a more 'pragmatic' approach to benefit both academic and practitioner communities (Tranfield et al. 2003). However, in this thesis a non-systematic, narrative review, is considered more appropriate because of the following reasons.

A narrative review is useful to educate, enables the author to obtain broader perspective on the topic and appropriate for describing the history or development of a problem and its

management (Cook et al. 1997; Green et al. 2006). This is needed in the thesis, especially concerning peripheral ports, since peripherality in a wider context besides seaport and transport should also be considered such as in geography, transport geography or economics. A narrative review could also inspire future research ideas from inconsistencies in existing literature (Cronin et al. 2008). Moreover, Baumeister and Leary (1997) claim that one of the goals of narrative literature reviews is to reveal problems, weaknesses, and controversies in a field, or basically inform that some difficulty exists.

Both narrative and systematic reviews should be cautious of bias, hence it is important to uphold both appropriate writing techniques and objectivity (Green et al. 2006). In order to present the findings of a literature review in a clear and consistent way, the review should be framed into categories such as themes, methodological categories, theoretical/empirical type or in chronological order (Carnwell and Daly 2001; Cronin et al. 2008). Therefore, the literature review in this thesis is framed into four main parts, with each part explaining related concepts/themes as described in Figure 2.1: Peripheral Ports, Container Hub Ports, Willingness to Invest and Development of Conceptual Framework.



Source: Author

Figure 2.1 Main Concepts in Literature Review Chapter 2

2.1 Peripheral Port

Seaports have been a part of the long history of mankind. They hold an important role related to spatial (geographical) and economical development of the world. Maritime trade has been happening for a long time, with approximately 90% of global trade carried by sea (IMO 2012). As countries of the world continue to trade, the shipping and port industry as main players in maritime transport constantly develops and adapts. The need for faster and efficient trade has created 'revolutions' in the maritime transport. Two major revolutions are the increasing size of vessels and the use of containers (Meersman et al. 2005). Containers as a standard unit to transport freight started in 1956 in the United States and spread over Europe in the 1960s (Notteboom 1997).

Since ports are a nation's gateway for trade (Owen, 1914 cited in Heaver 2006, p.15), hence this revolution has a huge effect, forcing every country in the world to modernise their ports with enough vessel berth size and container handling facilities. In the early 1980s more changes happened because of three contexts, which were globalisation, technological development and the increasing concern on environment (Pinder and Slack 2004). Reciprocally these three contexts were also shaped by the industries themselves (Pinder and Slack 2004). However, the fortunes of ports varies determined by their competitiveness and location (Hoyle 2000; Pettit and Beresford 2008). There are ports located in more peripheral places.

2.1.1 Definition of Peripheral Port

Definitions of peripheral ports are explored in a general context, maritime transport and seaport context.

General Context

Before looking at the port context, a better understanding of peripherality from a general point of view is useful. According to Oxford Dictionary (2016b), peripheral means relating to or situated on 'the edge'. In the 1960s, the peripheral was identified as the less developed countries or economies. In the economic development context, there is a spatial relationship between the developed and less developed economy where they actually support each other. The 'Dependency Theory' by Andre Gunder Frank states that the whole world is a series of 'constellations' which consist of metropolis and satellites cities (1967, pp.146-7 cited in Knox and Agnew 1998; MacKinnon and Cumbers 2011). The metropolitan core exploits its 'satellites' which were actually established historically from colonialism and post-war

imperialism (MacKinnon and Cumbers 2011). In other words, an independent development is impossible because development in one place requires underdevelopment somewhere else (Knox and Agnew 1998).

Also in the early 1980s, Immanuel Wallerstein with his famous 'World-System Theory' pictures the world economy as an evolving market system in a form of a three level hierarchy: core, semi-periphery and periphery (1984 cited in Knox and Agnew 1998). The 'core' are countries of the world who have capital, operate processes involving relatively high wages, advanced technology and a diversified production mix, while the 'periphery' involves the opposite of that and 'semi-periphery' involves a mix of the two extremes (Wallerstein 1984 cited in Knox and Agnew 1998). The term core, semi peripheral and peripheral in the World-System Theory shows that a hierarchy exists between countries of the world. There is a trend that the gap between core and periphery is increasing, anywhere geographically, either in a developed (the North) or developing countries (the South) (Hopkins and Wallerstein 1996; Erkut and Özgen 2003).

In addition in the context of development, Friedmann (1966 cited in Rodrigue 1998) describes peripherality as a spatial inequality which is then reduced and transformed by a functionally integrated urban system. His view looks at an emerging regional urban system in parallel with development of regional transport systems in four major stages, which are pre-industrial, transitional, industrial and post-industrial (Friedmann 1966 cited in Rodrigue 1998). Based on the terminology used in Dependency Theory and World-System Theory, the core and periphery will be used further in the context of seaports in this thesis.

In the context of geography, Langholm (1971) expressed 'centrality-peripherality' as denomination of accessibility. Ball (1996) constructed peripherality as remoteness or inaccessibility, especially limited access to transport networks and to the market. Meanwhile, Copus (2001) mentioned the conventional concept of periphery as remoteness from the main centres economic activity and population. Peripherality is also associated with 'marginality'. Bickerstaff et al. (2006) mentioned that both peripherality and marginality means remoteness, however, a clear distinction is made with marginality related more to sociocultural issues while peripherality is related more to political-economic issues. Hence, this research will focus on the concept of periphery as remoteness and inaccessibility to transport networks and market or economic centres.

In the context of economic geography, Paul Krugman with his New Economic Geography concept uses the core/centre and periphery terms to differentiate locations by its manufacturing role (core) and agricultural role (periphery) (Krugman 1991b, a, 1998). He tries to answer why manufacturing or production activities are located in particular areas, which is answered by his models. He explained that the core-periphery pattern is a result of economies of scale, transportation costs and manufacturing's share in a national income (Krugman 1991b).

In the context of economy, Swyngedouw (1992) analysed the work of Marx (1977) and argued that space or location is a pattern of spatial configuration which should be taken account in political-economic processes. Erkut and Özgen (2003) argue that economic peripherality leads to spatial peripherality. In the case of Southeastern Europe's border regions, the peripheral areas continue to be affected by unequal economic and spatial pattern such as the unequal distribution of investment and development (Erkut and Özgen 2003). However, the concept of peripherality not only relates to spatial-economical aspects. Copus (2001, p.543) argued that traditional indicators of peripherality in economic gravity models, e.g. GDP, employment and economic structure, compiled from the work of Keeble et al (1981, 1988), Linneker and Spence (1992) and others are not enough. With advancing information technology, business, institutional networks, etc, there are aspatial aspects in the concept of peripherality (more explanation in Section 2.12) or in other words less related to location (Copus 2001).

Maritime Transport Context

From a transportation perspective, peripherality has been increasing by the development and innovations in transport such as shipping technology and the development of hubs – spokes (Knowles 2006). More specifically in maritime transport, the hub and spoke system with the addition of containerisation, causes more peripherality for smaller ports as described in the work of Hayuth (1981) and Fleming and Hayuth (1994). Peripheral ports are smaller ports which are competing for the 'leftovers', feeder traffic from larger ports (Hayuth 1981). Peripheral ports will eventually be able to capture traffic when the larger ports are congested, which is mentioned by Hayuth (1981) as the concept of 'Peripheral port challenge' and will be explained more in Section 2.1.5. Meanwhile, Fleming and Hayuth (1994) brought up the terminology 'centrality' and 'intermediacy' as spatial qualities that identifiy the port location as strategic within transportation systems hence having high level of traffic. Centrality and intermediacy will be explained more in the development of hub ports in Section 2.2.4.

Besides being not strategic, peripheral could also mean unfavourable. Wilmsmeier and Monios (2013) brought the work of Swyngedouw (1992) to the port context describing that peripheral ports are the opposite of ports having a 'favourable location'. The unfavourable location is added by political-institutional factors, for example are the ports in Scotland becoming more peripheral and less important because the British central government favours developing south-eastern ports and land infrastructure compared to supporting development of infrastructure and maritime policy for Scottish ports (Monios and Wilmsmeier 2012). Scotland's trade eventually relies on land transport through England (Monios and Wilmsmeier 2012; Wilmsmeier and Monios 2013). Besides competing with other transport modes, ports also compete with other ports with location as one of their bargaining power in the market because ports in prime location has options in negotiating with alternate shipping lines (Heaver et al. 2005).

Another view to look at peripheral ports position compared to the large hub ports. In a network of ports, peripheral ports are the feeders (Robinson 1998) and they are dependent to hub ports (Ducruet 2008). Ducruet (2008) argued that there are mainly three level or degrees of being dependent to a hub, they are: the low degree which are load centre ports, medium degree which are secondary ports and highest degree which are the peripheral ports. This high degree of dependence means that they are connected to the rest of the world through a main hub, unable to handle their own traffic which are carried by smaller vessels through feeder services (Ducruet 2008). More on this in Section 2.1.4.

Seaport Context

In the specific context of seaports, peripheral ports can generally be identified by the size. They are primarily small and 'desperate' for cargoes brought by carriers from load center ports (Hayuth 1981). The remoteness itself leads to low volumes for the carriers or shipping companies, as stated by Dunbar-Nobes (1984):

> *'Remoteness entails empty hauls for tramps and bulk-carriers, and raises the cost of liner calls particularly where there is an imbalance between inbound and outbound cargo movements'* (Dunbar-Nobes 1984, p.84).

There is no exact threshold for the volume of ports to have a peripheral status. Being small means that there are likely to be a range of problem to deal with. They have to make sure the investments to develop and modernise infrastructure and facilities are justified with their low volume (Dunbar-Nobes 1984; Notteboom 2005). They have their own roles as 'local

terminals' which are as important as the large hub ports, rather than trying to compete with them (Notteboom 2005). They are not considered important for the maritime network and international trade, but they are important in terms of trade and economic benefits for their own region and hinterland (e.g. Mangan and Cunningham 2000; Wang and Slack 2004; Bryan et al. 2006).

In addition, ports being peripheral does not mean that they will necessary stay peripheral permanently. A region's economic development depends on its port's facilities, however, the fortune of the port itself in the long term is determined by its hinterland's trade (Sargent 1938 cited in Hilling and Hoyle 1984). Therefore, the port grows as trade in its region grows as well, as stated by Sargent (1938) that *'in the beginning the harbour made the trade; but soon the trade began to make the harbour'* trade (cited in Hilling and Hoyle 1984). Ports are mentioned as '*a dynamic phenomenon*' by Hoyle (2000) because its character, functions or status in a hierarchy are likely to change by various factors.

Pettit and Beresford (2008) show the example of UK's western ports such as Cardiff, Newport and Liverpool, that have been declining since the 1960s and perceived as geographically disadvantaged when the fortunes of the southeast ports increased. Eventually after the 1990s, throughput in these ports started to grow by securing individual contracts and managing their business well (Pettit and Beresford 2008). Another example is the rise of Chinese ports with the increasing direct calls as a result of infrastructure expansions and hinterland penetration of their inland cities (Ducruet et al. 2010), explained as follows:

> *"The transformation of rapidly emerging ports that were once peripheral into dominant ports is not possible without a stage of hub dependence upon already existing large hubs or gateways. Before reaching a stage of full maturity where their traffic is homogeneously widespread among their connections, they must ensure a series of requirements in order to upgrade not only traffic volume but also network positioning on the long-run"* (Ducruet et al. 2010, p.19).

Based on the definitions of peripherality and peripheral ports explored here, it is understood that a core – peripheral pattern exist. Hence, for the purpose of this specific study, peripheral is defined as follows:

> *'Ports which handle small cargo volumes, which have limited economies of scale, which are distant from major markets, and which have limited access to economic*

centres, markets or production centres, hence becoming non-preferred ports of call by large shipping companies and dependent on larger hub ports via feeder services.'

The definitions of peripheral and peripheral port are summarised in Table 2.1. Since peripheral is mostly perceived as a disadvantage, therefore, this next section will explain not only about its disadvantage but also its advantage.

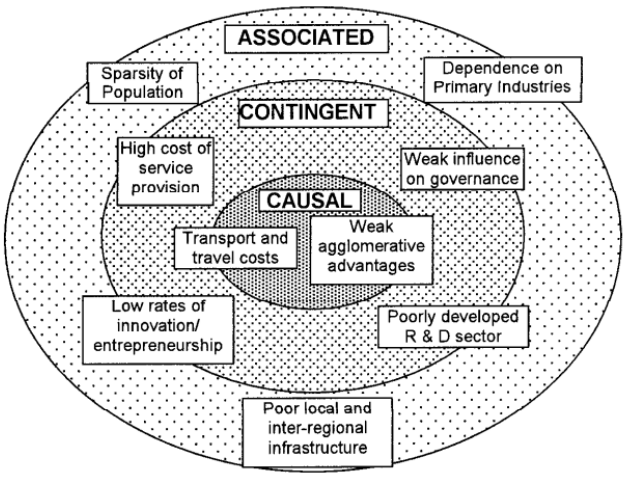
Table 2.1 Definitions of Peripheral and Peripheral Port

Context	No	Definition of Peripheral	Source
General, Development, Geography, Economics,	1	Situated on the edge.	Oxford Dictionary (2016b)
	2	Less developed, the edge of a constellation or bottom of a market hierarchy, where the peripheral is supporting the core.	Wallerstein (1984 cited in Knox and Agnew 1998); Frank (1967 cited in Knox and Agnew 1998)
	3	Core-periphery representing regional urban systems which is equal to regional transport systems.	Friedmann (1966 cited in Rodrigue 1998)
	4	Gap between core-periphery increasing.	Hopkins and Wallerstein (1996)
	5	Remoteness and inaccessibility to transport network, market, economic and population centres.	Langholm (1971); Ball (1996); Copus (2001); Bickerstaff et al. (2006)
	6	Core-periphery pattern is a result of economies of scale, transportation costs and manufacturing's share in a national income.	Krugman (1991b)
	7	Aspect of location to be considered in political-economic processes.	Swyngedouw (1992)
	8	Economical peripherality leads to spatial peripherality.	Erkut and Özgen (2003)
	9	Aspatial aspects related to peripherality.	Copus (2001)
Transport, Maritime Transport	1	Peripherality becomes worse with the advancement of innovations in transport.	Knowles (2006)
	2	Containerisation and development of hubs adds more peripherality, the opposite of centrality and intermediacy, not strategic.	Hayuth (1981); Fleming and Hayuth (1994)
	3	Unlike prime locations, peripheral ports have less bargaining power.	Heaver et al. (2005)
	4	Unfavourable location, ports competing with other transport modes or other ports.	Monios and Wilmsmeier (2012); Wilmsmeier and Monios (2013)
	5	Being feeders at the lowest port hierarchy based on efficiency and cost.	Robinson (1998)
	6	The degree of being hub dependence or competition in the maritime network.	Ducruet (2008)
Seaports	1	Small in size, desperate for cargo.	Hayuth (1981)
	2	Low volume or throughput, imbalanced cargo.	Dunbar-Nobes (1984)
	3	Should focus on their own role as 'local terminals'.	Notteboom (2005)
	4	Less importance for the maritime network but important for their region or hinterland.	(e.g. Mangan and Cunningham 2000; Wang and Slack 2004; Bryan et al. 2006)
	5	Peripherality status could change.	Sargent (1938 cited in Hilling and Hoyle 1984); Hoyle (2000); Pettit and Beresford (2008); Ducruet et al (2010)

Source: Author

2.1.2 Disadvantage and Advantage of Peripherality for Ports

Locations with peripherality are perceived as a 'problem' for the government with implications such as extra costs and assistance is needed for the local authorities and development agencies (Ball 1996). Copus (2001) classified conventional concepts on peripherality to three elements that are causal, contingent and associated disadvantages, as described in Figure 2.2, which also shows the spatial and aspatial aspects of peripherality. The causal disadvantage is that peripherality increases travel and transport cost, in the centre of the diagram. The contingent disadvantages are what comes next, such as high cost of service, lack of entrepreneurship and innovation, as a result of no economies of scale. Lastly, associated disadvantage is the indirect relating to population such as sparsity, dependence on primary industries and poor local infrastructure development. Disadvantage of peripheral could be seen the opposite way, as the benefit of good locations or advantage of agglomeration. 'Favourable' locations enhance productivity for the deployed investment (Swyngedouw 1992).



Source: Copus (2001)

Figure 2.2 Conventional Concepts of Peripheral Disadvantage

On the bright side, peripherality has its own advantage or benefit such as being 'extraordinary' for tourism (Urry 1990 in Ball 1996) or desired for residential location and low wage costs (Ball 1996). Higher transport costs in these location could also be a barrier for competitors or other large companies to enter new business, for example in manufacturing sector (Behrens et al. 2006; Lafourcade and Thisse 2009). High transport and poor transport connection is sometimes needed to protect local market or industries in the periphery, as a way to decentralize industries from core regions (Fujita and Mori 1996). Moreover, Gouvernal et al. (2011) argued that rural or peripheral locations are attractive to

be built as logistic hubs because it has more flexibility. It is more flexible from zoning restrictions to get permission than in urban locations, also having flexible work schedule and wage rate which could still be attractive to workers (Gouvernal et al. 2011).

Since being peripheral has its own advantages, then what is the urgency to support peripheral regions? According to Gallup et al. (1999), peripheral locations are disadvantaged from internatonal trade. Geographic location and climate effects income levels and income growth by affecting economic policy choices, and the disadvantaged location are places far from coasts and ocean-navigable rivers because it induces more transport costs of international trade (Gallup et al. 1999). McKinnon (1992) investigated Scottish manufacturers, which are considered Manufacturers in a peripheral location, with relatively small industrial base and local market. They disadvantage from lack of direct freight services and inadequate quality of transport services, surveyed from Scottish manufacturers in the periphery (McKinnon 1992).

According to Yuen et al. (2017) from their study on air cargo airports, improvements in the transport connections between gateway and hinterland (regional) airports brings social welfare at both gateway and hinterland airport such as benefits for shippers and passengers. However, specifically for the hinterland airport, airport and airline profits will decrease (Yuen et al. 2017). Furthermore according to Candau (2008), there is a link between good governance, trade and agglomeration in the urban region. Their research shows that by supporting the periphery to trade with the external market, bad governance and embezzlement could be reduced (Candau 2008). Therefore, taking consideration the advantage and disadvantage of peripherality, it all actually comes back to enabling trade and reducing transport cost.

In the context of ports and shipping, the disadvantages of the periphery are as follows. Periphery brings imbalance factors and load factors hence becomes a business risk because of its low volume (Chen et al. 2013). It is also unable to generate economies of scale and density (Nijkamp 1998 in Wilmsmeier et al. 2014). Especially for containerised products, peripheral regions have more burden because of additional costs related to repositioning empty containers (Monios and Wang 2014). The cost to reposition empty containers consist of inland and international transport cost, and trade imbalance could be still be tolerated if the repositioning costs are still low until a certain point (Notteboom and Rodrigue 2008). Instead of trying to capture more hinterland cargo to increase volume, Monios and

Wilmsmeier (2014) suggested that smaller regional ports should focus more on the needs of local shippers, take advantage of land availability, cheaper rents and semi-skilled labour. The advantages and disadvantages discussed in this section are summarised in Table 2.2. Now that the definition, advantage and disadvantage of peripherality has been explained, next is to continue looking at the detail of peripheral ports. This includes the nature of peripheral ports and their development.

Table 2.2 Advantage and Disadvantage of Peripherality

	No	Peripherality	Source
Disadvantage	1	Problem of extra costs and assistance for the government.	Ball (1996)
	2	Having causal, contingent and associated disadvantage.	Copus (2001)
	3	Does not enhance productivity for deployed investment.	Swyngedouw (1992).
	4	More transport costs of international trade	Gallup et al. (1999)
	5	Lack of direct freight services and inadequate quality of transport services lack of direct freight services and inadequate quality of transport services	McKinnon (1992)
Disadvantage for ports	6	A business risk for shipping because of low volume.	Chen et al. (2013).
	7	Having cargo imbalance and additional cost for repositioning empty containers.	Chen et al. (2013), Monios and Wang (2014).
	8	Unable to generate economies of scale and density.	Nijkamp (1998) in Wilmsmeier et al. (2014).
Advantage	1	Desired for residential location and low wage costs.	Ball (1996)
	2	Having flexibility with zoning restrictions, work schedule and wage rate.	Gouvernal et al. (2011)
Neutral	1	Opening periphery with external market would reduce bad governance and embezzlement.	Candau (2008)
	2	Improvements in the transport connections between gateway and hinterland (regional) airports brings social welfare at both gateway and hinterland airport.	Yuen et al. (2017)

Source: Author

2.1.3 Development of Peripheral Ports

Nature of Peripheral Ports

Besides the terminology peripheral ports, researchers also mention regional ports and small/medium sized ports. Feng and Notteboom (2013) defined small medium ports (SMP) as ports with cargo volume below 300 million tons and 150 million tons. They compared SMPs with gateway ports, seen in Table 2.3, as a result of clustering ports in Bohai Sea Economic Rim (BER) in China. Feng and Notteboom (2013) classified SMPs as dominantly not containerised, driven by domestic cargo and less connected to other global level hub ports.

Researchers also use the terminology of regional ports to explain ports in less central geographical positions. The word 'regional' here could be regional ports in global level or in national or country level. Studies looking at regional ports in a global level, for example discussed how changing patterns of trade in the world brings growth and reorientation to regional hub ports in Asia such as ports in South Korea and Kaohsiung in Taiwan (Haynes et al. 1997; Lee and Rodrigue 2006).

Table 2.3 Characteristics of SMPs and Hub Ports

Characteristics	Small Medium Ports (SMPs)	Gateway Ports
Port Size	Medium Size: cargo volume of 150-300 million tons, Small Size: cargo volume of less than 150 million tons	Cargo volume of over 300 million tons
Port Classification	Domestic trade driven	International trade driven
Cargo	Bulk	Container
Market Share	Increasing	Stable to decreasing
World spoke and hub system	Less Connected	Connected
Port-city	Less correlated	Correlated
Logistics System	Inland port connection	Logistics park
Port Networking	Co-petition	Competition
Intermodality	Less connected	Connected

Source: Feng and Notteboom (2013, p.65)

Moreover, UNESCAP (2002) discussed regional ports as ports in Asia and Pacific region, which are not global premier or advanced ports, since more MNCs are searching for industrial and logistics centres. They provided 7 main guidelines as concern for these regional ports to be able to develop as logistics centres, which are: effective planning and development, institutional incentives, Free Trade Zone development, infrastructure financing, information technology development and overcome regulatory and administrative problems (UNESCAP 2002). McLaughlin and Fearon (2013) looked at regional ports as ports within the regional continent (concerning one or more than one countries) such as in Asia and Europe, how the compete and cooperate with each other and proposed a cooperation/competition matrix to evaluate strategies.

On the other hand, there are also studies using the term regional ports at a country level. Debrie et al. (2007) looked at regional ports as smaller ports in Canada and France which are adapting with port devolution or privatisation, which involves private sector, central government and local government. Sakalayen (2014) studied the role of regional ports on regional development and looks at regional port in a national context. He adopted the term regional port from Australian region as 'non-metropolitan and rural areas' and defines regional ports as the ports outside metropolitan cities serving regional businesses. He

developed strategy for Australian regional ports, which is important since these ports contributes approximately 85% of the national freight task. Using mixed methods approach, interviews and survey, he concluded that Australian regional ports are critical in the regional development in four main factors: '*interactive and entrepreneurial in the regional innovation system (RIS), collaboration for supply chain efficiency, collaboration with other regional organisations and ports being proactive for environmental challenges and social responsibility'* (Sakalayen 2014).

Development of ports in peripheral locations need special considerations because there are more issues to be addressed related to its peripherality. The nature of having small volume impacts to freight costs and inefficient shipping operations, since volume of cargo creates economies of scale (UNCTAD 2015). From the shipping's side, smaller vessels have less efficiency on fuel per unit carried, while from the port's side, smaller ports have higher operating costs per ton of cargo and longer pay back period for infrastructure investments (UNCTAD 2014).

Smaller and/or uncertain cargo volume also brings imbalanced cargo for shipping liner operations. Imbalance here means the ship's cargo volume in outbound trip exceeds its return trip, or vice versa, hence put a higher price to 'compensate' under-utilisation of the ship on one of trips. As an example, evidence shows that most countries in Africa and Oceania have freight rates for imports more expensive than those for exports (UNCTAD 2015). This explanation from UNCTAD (2015) here summerises how imbalanced cargo affects transport cost in shipping:

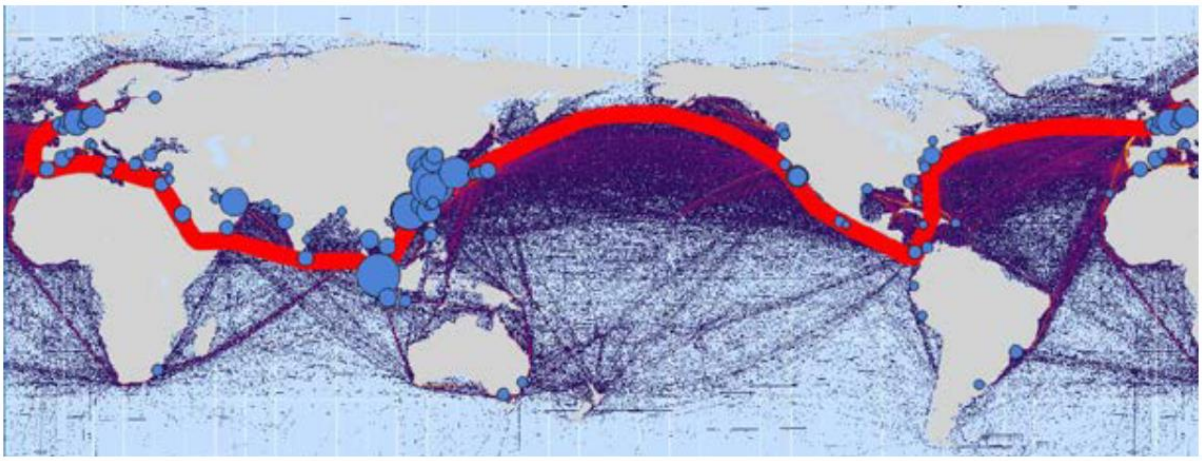
> *"Freight rates will be higher for the shipments transported on the leg of the trip with more traffic, as the total amount charged for this leg must compensate the relatively reduced income from the return trip, when part of the vessel's capacity will inevitably be taken up with repositioned empty containers. Excess capacity on the return trip will increase the competition between the various liner services, and as a result freight rates will tend to be lower"* (UNCTAD 2015, p.54).

Imbalanced cargo further implies empty containers will need to be handled. Local stakeholders together with the port operators have different ways to solve this, as seen in the case of empty container repositioning in Scottish ports studied by Monios and Wang (2014).

Small Islands Developing States (SIDS)

More extreme cases of peripheral ports are the Small Island Developing States (SIDS). UNCTAD's Maritime Review document had a special chapter on SIDS which defined them not only as having small trade volumes, imbalanced cargo and small populations, but also having other geographic, economic and environmental challenges (UNCTAD 2014). They are sea locked and having relatively high distance with the main East-West global shipping route. They are economically developing countries which depends mostly on foreign trade (high import, low export). Domestic inter-island trade and transport is equally important as well, since these nations are made of spread islands with various distances. They are also vulnerable to natural disasters such as having strong weather, high seismic activity and prone to climate change.

SIDS are located in different parts of the globe, which are grouped by UNCTAD (2014) in 4 main regions: in the Caribbean, the Indian Ocean, the West African and the Pacific. Some ports within the SIDS have successfully attracted shipping lines, enabled larger container ships to enter and increase cargo volumes by becoming transhipment hubs, such as in Bahamas, Jamaica and Mauritius. Having the nature of peripheral ports, SIDS have transport costs higher than the world's average. UNCTAD (2014) estimated expenditures on international transport as a percentage of the value of imports, in average year 2004-2013, resulting on average SIDS paid 2 per cent more than the world average of 8.1 per cent during the period, and highest values found in Comoros – Indian Ocean (20.2 %), Seychelles – Indian Ocean (17.9 %), Solomon Islands – Pacific Ocean (17.4 %) and Grenada – Caribbean Sea (17.0 %). Figure 2.3 depicts the main East-West global shipping route.



Source: UNCTAD (2014)

Figure 2.3 Main East-West Shipping Route and World's Largest Container Ports

Dunbar-Nobes (1984) had written about SIDS before UNCTAD on their case study on Pacific Nations, discussing the cases of Tuvalu, Vanuatu and Fiji. These three separate nations have the same overall challenge as SIDS explained in UNCTAD's Maritime Review. However, they also have specific difficulties. Tuvalu, being the smallest has problems with underutilisation of their deep-water wharf and overinvestment. Vanuatu, the medium sized nation is trying to work out how to change their concentrated port system to be decentralised into 1 main port for import and 1 main port for export. Lastly, the largest and most important nation in the region is Fiji which has become the re-exporter of goods for the surrounding island nations. Fiji's difficulties are adapting to containerisation, the impacts of labour strikes and congestion as a result of regional and national traffic.

Moreover in their book chapter, Dunbar-Nobes (1984) explained chronologically their adaption of containerisation. These nations tried to upgrade their infrastructure and facilities in order to secure a place in shipping voyage schedule. Then Funafuti's (Tuvalu) and other smaller ones lost competition and were exlcluded, resulting in overinvestments. There were also development projects from foreign aid for planning and technical support. However, aid very much depends on the demand of the donor country and does not focus on increasing overseas linkages.

Peripheral Ports in Developed Countries

Challenges in the development of peripheral ports appears in all parts of the world, developed countries are no exception. Monios and Wilmsmeier (2012) mentioned ports in Scottland as having 'double periphery' because of lagging infrastructure development - physically and government initiatives -institutionally (Monios and Wilmsmeier 2012). Container ports in north and centre of UK have lost importance and more concentration is happening in the southeast of UK close to the English Channel (Wilmsmeier and Monios 2013). They argued that having the UK government favouring southern England as external gateways, with a full privatisation model, creates path dependency and further embeds Scottish ports' secondary role in UK's international trade (Wilmsmeier and Monios 2013). The UK port system should try to counterbalance peripherality by developing port-centric logistics, dry ports and offshore logistics hubs (Monios and Wilmsmeier 2012). In addition, Baird (2006) argued that natural deep water port at Scapa Flow in Scottland has potential to become an offshore transhipment hub for Northern Europe because of less diversion distance from main shipping lines and having a good distance to surrounding feeder ports. However, stakeholders have not adopted this (Rodrigue and Notteboom 2010).

Similar case is the port of Darwin, North Australia. Being more peripheral in the country compared to south western regions, Darwin was prepared to be an intermodal transport hub to be able to capture cargo coming from Asia (especially Singapore) and cut 3 to 5 days from travel time compared to Adelade, Melbourne and Sydney (Wu 2011). However, it turns out the new transcontinental railway in 2005 created negative effects on Darwin because the volume of container trade and interstate export and import cargo that passes through the port declined (Wu 2011). Another case is Tallin International Airport in Estonia, a peripheral airport which provides service for passenger and cargo studied by Niine et al. (2017). Since 2010, a bold investment strategy was carried out to become hub in the Baltic Sea region. However, their efforts failed and resulted in the bankruptcy of Estonian Air. Their research tried to anwer whether growth can be created by increasing supply. However, survey results show that growth can take place driven by demand, not by increasing supply. Their survey on innovation also explains that is out of the service providers' innovation reach to make the local air cargo market more attractive for customers. As they summerised that: *"even without any substantial growth outlooks, the service providers do not generally see the market as in stagnation but instead focusing on qualitative improvements"* (Niine et al. 2017, p.8).

The lesson brought by Scottish ports, Port of Darwin and Estonia shows that developed countries also face the same problems. Improving infrastructure such as port facilities or intermodal facilities linking the peripheral ports does not directly bring more cargo volume. This is different to already existing gateway ports such as Port of Rotterdam, which has successfully enlarged their port hinterland by improving intermodal transport (Van Klink and Van den Berg 1998).

Besides effors to attract more cargo, small-peripheral ports in developed countries are also facing challenges in their port governance. Debrie et al. (2007) studied small ports in Canada and France related to their devolution or 'decentralisation' process from central government to lower tier government. The governments' purpose is to 'download' their financial responsibilities and reduce expenditures from their ports. Problems which arise are as follows (Debrie et al. 2007): Financial problems handed to the new management becomes more complicated with their own financial features; Sources of revenue are limited from small ports; Potential conflict of interest, as example municipalities prioritise tourism and urban functions of the port compared to industrial functions; A different way in planning and development of the port; Conflicts in transferring personnel, transferring finance and application of environmental laws. As a result, in these two country cases, a wide range of

partnership appeared for their small ports, dominated by the involvement of public actors from municipalities or regional government (Debrie et al. 2007).

A more successful case of peripheral locations with their logistics and transport development is Ireland, a developed economy which is perceived to be peripheral on the edge of continental Europe, in the study by Hannigan and Mangan (2001). Ireland's GNP increased by 62% in real terms and the value of overseas trade equals 155% of its GDP in the year 1994-2000. Ireland successfully attracted large multinational companies in electronics and pharmaceutical such as *Dell, Intel, Boston Scientific, Xerox, Hewlet Packard, Warner Lambert* and *Eli Lilly.* They discussed the driver of these success are improvement of transport infrastructure, more efficient resource management and operations, advanced/ best logistics practices, skilled employees, information technology and increased environmental awareness (Hannigan and Mangan 2001).

Peripheral Ports in Developing Countries

Developing countries in the world are also making efforts to improve their ports and transport infrastructure. Studies describes that emerging economies are putting effort to capture more opportunities from becoming hub in their region, more on this topic and peripheral ports in developing countries or developing economies discussed in Secton 2.3 in this Chapter. Within the developing countries, increased competition occurs, either competition for cargo and connectivity. One of the example is Port Montevideo in Uruguay in the study by Wilmsmeier et al. (2010). The history of the country's independence itself lies on the importance of Port Montevideo itself. The port is trying to attract more cargo and attract more direct calls from shipping lines. However, Montevideo is facing high competition with its neighbouring ports Buenos Aires (Argentina) and Rio Grande (Brazil), which are also developing countries with growing economies and improving shipping connectivities (Wilmsmeier et al. 2010).

However, positive indicators do not directly prove that a particular developing country could reduce its peripherality. According to the study on South Africa by Fraser et al. (2016) using graph theory and network analysis, still South African ports are considered peripheral. Evidence shows that South African ports' container throughput increases, having upward trend in vessel sizes calling at the port, having significant investments on port infrastructure and a having stable political environment. They argued that a transhipment hub can impact ports in two ways, first, a port can become 'less remote' if there is any transhipment hub

providing maritime access to overseas markets (Fraser et al. 2016). It also might happen the other way around that the transhipment hub 'lures' direct services away from a mainland port which makes the mainland port becoming 'more remote' (Fraser et al. 2016). Table 2.4 shows the main issues identified from literature on development of peripheral ports.

Table 2.4 Issues in the Development of Peripheral Ports

Context	No	Issues in Peripheral Port Development	Source
Nature of Small/Medium Ports and Regional Ports	1	Cargo volume below 300 million tons, dominantly not containerised, driven by domestic cargo and less connected to other global level hub ports.	Feng and Notteboom (2013)
	2	Regional ports as ports in less central geographical position in the global level or continent.	Haynes et al. (1997); UNESCAP (2002); Lee and Rodrigue (2006); McLaughlin and Fearon (2013)
	3	Regional ports as small ports in less central geographical position in country level, and important for regional development.	Debrie et al. (2007); Sakalayen (2014)
	4	Unable to reach economies of scale, inefficient shipping operations, high freight cost, imbalanced cargo.	UNCTAD (2014, 2015)
	5	Needs empty containers repositioning	Monios and Wang (2014)
Small Island Developing States (SIDS)	1	Sea locked, having relatively high distance with the main East-West global shipping route, economically developing countries which depends mostly on foreign trade (high import, low export), also vulnerable of natural disasters.	UNCTAD (2014)
	2	Overshadowed by over-capacity and over-investment, competition with surrounding small islands.	Dunbar-Nobes (1984)
Developed Countries	1	Double peripherality: need of physical infrastructure development and institutional government initiatives.	Monios and Wilmsmeier (2012)
	2	Determining hub in peripheral location should consider less diversion distance from main shipping lines and having a good distance to surrounding feeder ports.	Baird (2006)
	3	In the case of Darwin, improving transport links to a peripheral port could backfire the peripheral port.	Wu (2011)
	4	Increasing demand or cargo volume is needed instead of increasing supply.	Niine et al. (2017)
	5	Improvement in gateway and hinterland airport will benefit shippers and passengers	Yuen et al. (2017)
	6	Competition with existing hubs and other modes of transport	Wilmsmeier et al. (2010); Wu (2011)
	7	In the case of Ireland, peripheral ports could be improved by upgrading transport infrastructure and advanced/ best logistics practices.	Hannigan and Mangan (2001)
Developing Countries	1	Peripheral ports in developing countries are competing for cargo and shipping connectivity, as in the case of Uruguay.	Wilmsmeier et al. (2010).
	2	A transhipment hub can 'lure' direct calls away	Fraser et al. (2016)
	(More in Section 3.2.5 Research context on ports in global trade and emerging economies)		

Source: Author

Economic Impact of Ports

In port research and port economics, it is widely accepted that ports contribute to the economic development of the region it is located in. Unfortunately, countries that are landlocked and do not have seaports experience high costs of freight services and a high degree of unpredictability in transportation time (Arvis et al. 2007). The construction and operations of ports are an 'engine' for economic development of a country (Benacchio and Musso 2001; Talley 2009). Port Economic Impact Studies (PEIS) are usually conducted to measure the impact of port for its regional or national economy. PEIS provide justification for governments or companies to develop new ports or expand existing ones, also to understand the impact of different port characteristics (Danielis and Gregori 2013). Economic impact, whether national or regional impact, could be categorised by its type e.g. direct, indirect and induced impacts, or described in monetary or quantifiable variables e.g. GDP, value added, income, employment, taxes, and remunerations (Benacchio and Musso 2001; Bichou and Gray 2005; Acciaro 2008).

A more detailed relationship of ports to the regional economy can be seen in the work of Deng et al. (2013), in a survey in China which is analysed using Structural Equation Method (SEM). They tried to understand the relationship between port supply, port demand, port's value added activities and regional economy, with GDP and GDP per capita as measurement variable for regional economy (Deng et al. 2013, p.126). The results showed that port supply affects a ports demand to grow, with port demand affecting port's value added activity, and these added value activity affects the regional economy respectively (Deng et al. 2013), as shown in Figure 2.4. Deng et al. (2013) explained that port supply and port demand influence regional economy indirectly, mediated by the port's value-added activity.

Source: Deng et al. 2013

Figure 2.4 Relationship of Port Supply, Port Demand, Added Value Activity and Regional Economy

Moreover, the relationship of port cities and economic growth in port cities is studied by Shan et al. (2014). They conducted a PEIS of major ports in China on 41 port cities with econometric analysis and regression, with growth rate of GDP per capita as proxy for economic growth and the port's cargo throughput as proxy to port's production (Shan et al. 2014). The results showed that cargo throughput significantly impacts the economic growth of host city, where larger ports contributes more than smaller ports (Shan et al. 2014).Since

the nature of peripheral ports has been explained and the need of ports for economic growth, next is to continue looking at the bigger picture. Peripheral ports is not only about status, but also connections with other ports. This next section looks at transport development models and peripheral ports in a port hierarchy, which is an underlying hierarchy describing a structure of interrelated ports.

2.1.4 Transport Development Models and Port Hierarchy

Transport Development Models in Transport Geography

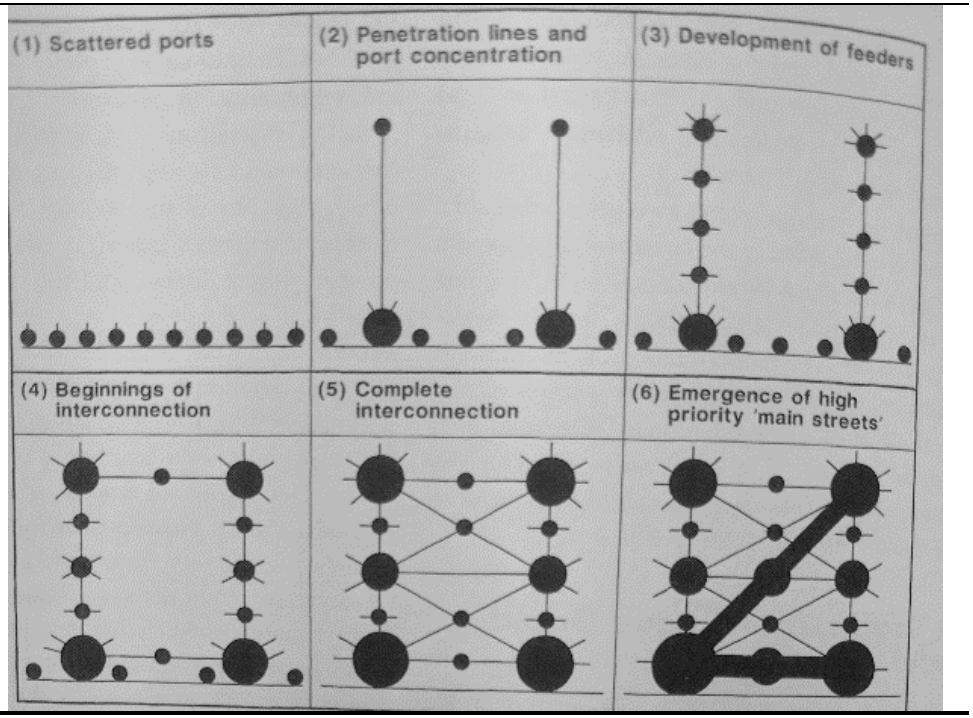
Hoyle and Smith (1998) explained that transport is an 'epitome' of the complex relationship between physical environment, social and political activities and level of economic development. Moreover, they argued that most researchers in this field present patterns in port development as influenced historically by the emergence of global mercantile system and the ensuing colonial period. It built the foundation to global links, urban hierarchies and transport nodes (Hoyle and Smith 1998). These transport development models related to seaport are described in Table 2.5. It consists of the Taaffe, Morrill and Gould Model by Taaffe et al. (1963), Anyport model by Bird (1963) cited in Rodrigue (2017), Mercantile Model by Vance (1970) cited in Hoyle and Smith (1998, pp.17-27), Rimmer Model by Rimmer (1977) cited in Hoyle and Smith (1998, pp.17-27), Port Ownership Model by World Bank (2001) and WORKPORT Model by Beresford et al. (2004).

Studies in Table 2.5 are considered necessary to be included in this study, to understand factors from transport development models emerged in the 1960s and 1970s until today that are classic literature in transport geography and maritime economics. From Table 2.5, the argument from Hoyle and Smith (1998) is seen since different factors influence the development of hub ports related to economics (trade, development), politics (colonialism, governance, ownership), and port operations (infrastructure, cargo handled).

Changes in the Role of Ports

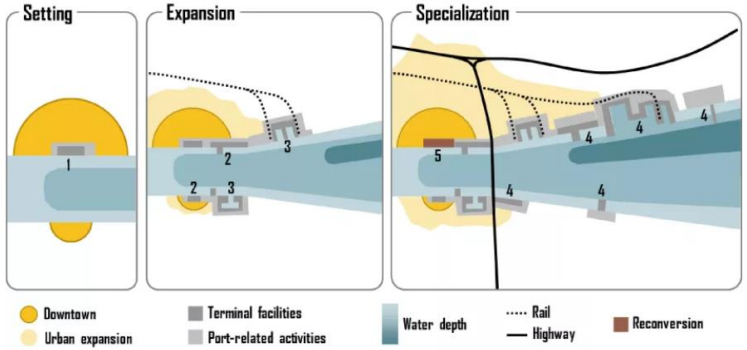
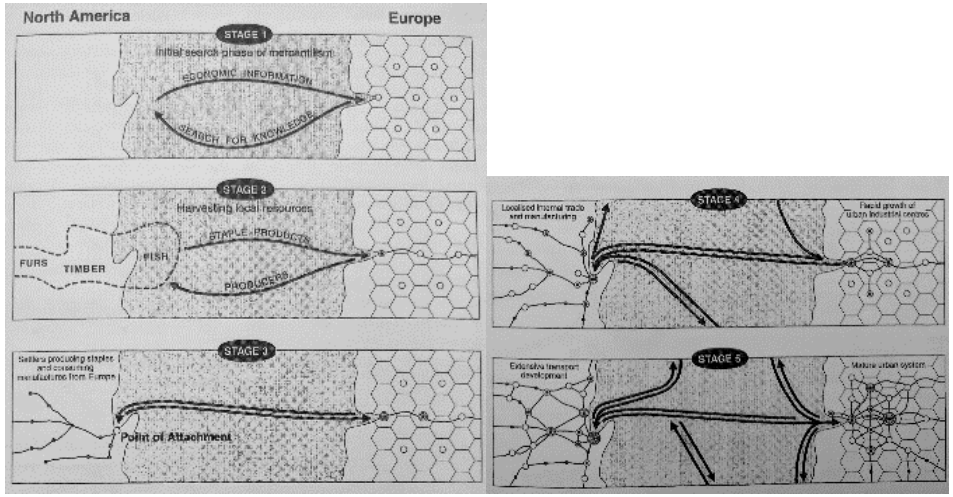
The role of ports as they develop becomes more critical, which is usually mentioned as port development, port evolution or port system evolution. As part of the maritime industry, port issues increased because of globalisation, technological development, increasing concern on environment and more complex organisation/ownership (Beresford et al. 2004; Pinder and Slack 2004; Pallis et al. 2010). In the first half of the twentieth century, port are seen as 'gateway for a country's trade', with wider gate and smoother road meaning the greater 'trade-gain' for the country (Owen 1914, p.17 cited in Heaver 2006, p.15).

Table 2.5 Transport Development Models Related to Seaport

Models	Purpose & Location of Study	Stages	Description
Taaffe, Morrill and Gould Model by Taaffe et al. (1963)	Describes the development of inland transport routes as a result of established political and economic significance in Ghana and Nigeria, West Africa.	1: Ports are scattered in the coast. 2: Inland transport are established. 3: Development of feeders. 4: Development of interconnection between feeders. 5: Complete interconnection. 6: Development of main roads and transport corridors.	

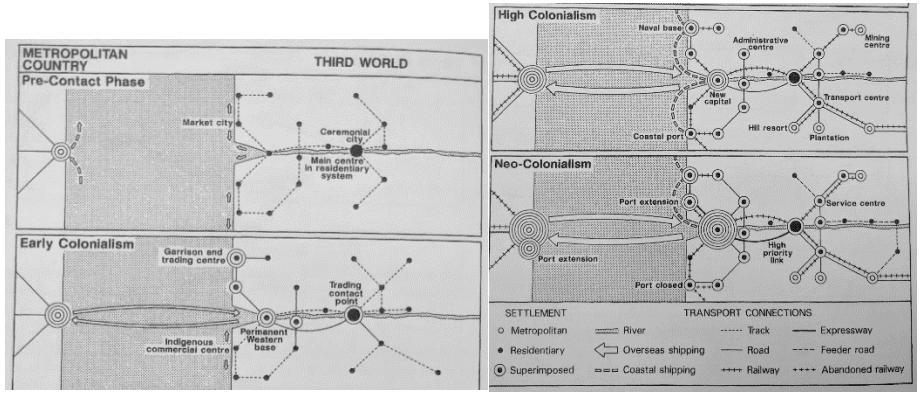
Source: Author

Transport Development Models Related to Seaport (Continued)

Models	Purpose & Location of Study	Stages	Description
Anyport model by Bird (1963) cited in Rodrigue (2017)	Describes the pattern and standard development of seaports from traditional facilities, expansion to specialisation, from the context of British seaports.	1: Primitive port, growing until there are overflowing port function and change of location 2: Marginal quay extension, not only continuous line of quays 3: Marginal quay elaboration, harbour expansion 4: Dock elaboration, with simple lineal quayage 5: Simple lineal quayage, deep water berths 6: Specialised quayage for various cargo types, the use of the whole waterside sites	
Mercantile Model by Vance (1970) cited in Hoyle and Smith (1998, pp.17-27)	Describes the development of transport links and growth of urban hierarchy in North America as a result of European market expansion. Focuses on trade and exogenous forces.	1:Wealth accumulation causes European to explore and expand their market to North America. 2:Trans-atlantic trade routes are developed one way to transport staple products (fish, fur and timber) produced by the settlers to Europe. 3:Trade routes goes both ways because settlers also imports/consume goods from industrialised Europe. 4:The development of trade and manufacturing inland of North America. 5:Internal trade in NA dominates trade with Europe, mature transport.	

Source: Author

Transport Development Models Related to Seaport (Continued)

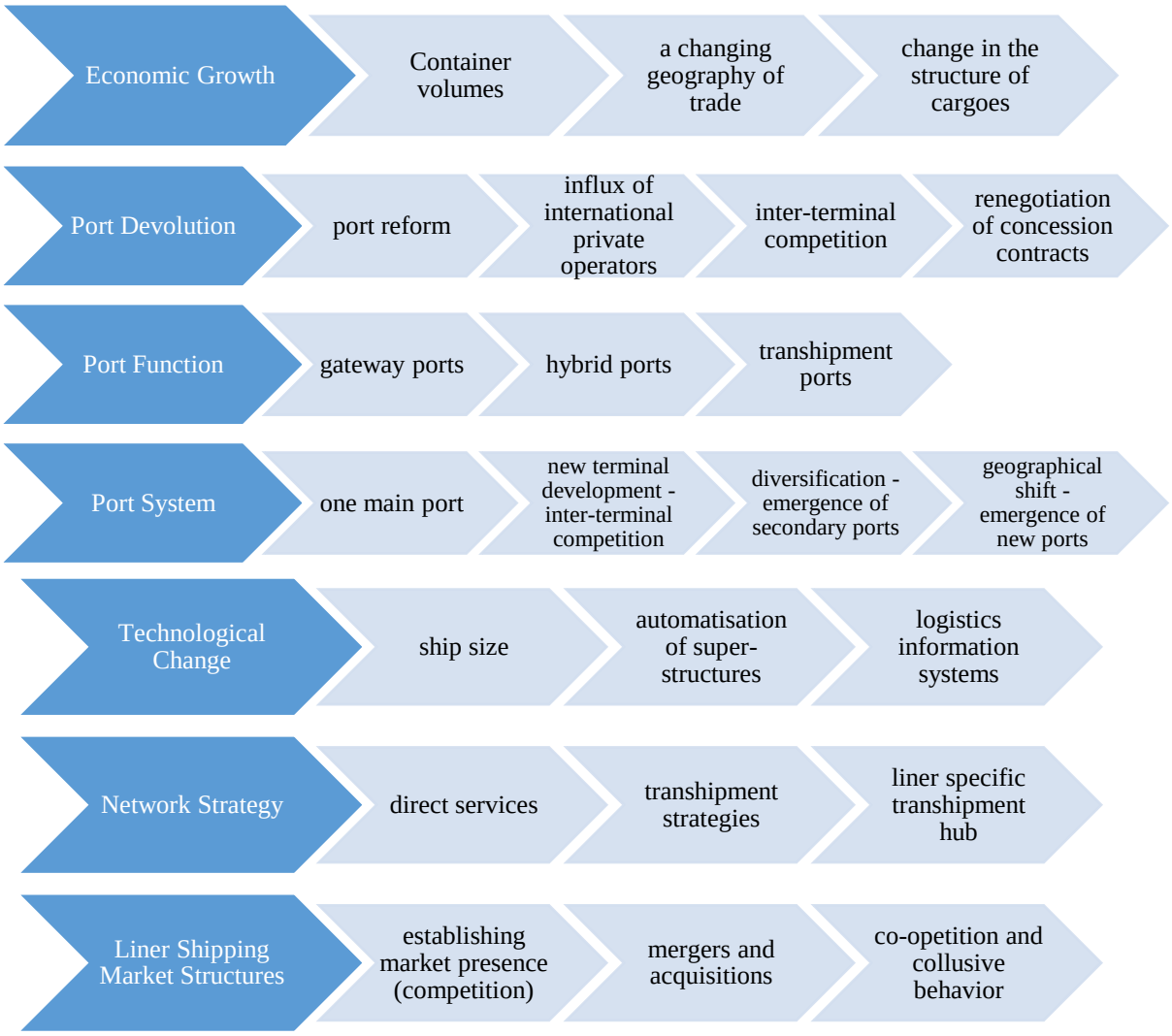
Models	Purpose & Location of Study	Stages	Description
Rimmer Model by Rimmer (1977) cited in Hoyle and Smith (1998, pp.17-27)	Describes hybrid transport system as a result of existing indigenous system and colonialization. Focuses on political, cultural and economic perspective.	1:Existing Thirld World country transport network. 2:Direct contact with colonialization through sea transport. 3: High level of colonialization resulting in more port facilities, development of inland transport, industrialisation and urbanisation. 4: Neo-colonialism with further development, modernisation of transport system, adjustments and economic diversification.	
Port Ownership Model by World Bank (2001)	Explains categories of ports by its ownershsip. It is part of the World Bank's Port Reform Toolkit to guide governance and operations for ports around the world.	Types of ports by ownership: • Service port: Entirely under state/government. • Tool port: Private actors are permitted to operate in cargo handling under concessions. • Landlord port: Private actors are permitted to invest in superstructure and operate cargo handling under concessions. • Private port: Entirely under private control.	
WORKPORT Model by Beresford et al. (2004)	Represents changes in European ports from the 1960s to 2000s.	There are 9 aspects of transition: • Ownership: Increasing private sector involvement. • Cargo forms: Substitution of unitised for break bulk cargoes. • Cargo handling processes: Increasing automation and mechanisation. • Cargo support processes and information provision: Proliferation of methods. • Working culture: Decreasing numbers of workers. • Port function / port development processes: Increasing diversity of port related activities. • Health and safety aspects of the working environment: Decreasing accident rates and absenteeism. • Environment: Increasing environmental awareness. • Decisive factors: Becoming more integrated with the interest of the whole port community.	

Source: Author

By the end of the twentieth century, ports were seen as a 'subset gateway' for regions, which has a great functional impact on that region even if the origin and destination are outside the gateway city (Bird 1980). After containerisation and the use of Post-Panamax vessels, in the 1990s ports are less labour intensive, increasing in private sector involvement, having more automation, more concern on quality service and port management (Beresford et al. 2004). This is described in the WORKPORT model by (Beresford et al. 2004), which represents changes in European ports from the 1960s to 2000s. In the twenty first century, ports are seen as part of a 'value-chain', contributing value to the transport or logistic chain (Heaver et al. 2001; Notteboom and Winkelmans 2001; Robinson 2002; Mangan et al. 2008).

More recent studies show that role of ports is becoming more complex. Container ports and its policies in one's country holds an important role for the nation's sovereignty as well (Hiney 2014). A multiple case study in the United Kingdom, Indonesia and South Africa using mixed methods by Hiney (2014) argued that container ports represent a nation's position in the political economy because it is at the intersection between globalisation (international forces) and labour-government policies (domestic forces). Results of the study shows that domestic politics has significant influence on international container port policy outcomes. Wilmsmeier et al. (2014) identified 'critical moments' on the evolution of port system which consist of 6 main aspects described in Figure 2.5. Not only from economic growth point of view (growth in volume, changing geography and structure of cargo), port development could also be seen from technological change, port devolution, port function, shipping line strategy and system inside the port itself (Wilmsmeier et al. 2014).

Furthermore, Lee et al. (2008) explained the uniqueness of Asian hub port cities compared to those of Western countries as described in Table 2.6. Asian hub port cities have a closer relation of port and city function. It started as fishing coastal village which is then chosen by Western colonials to support their trade and technology transfer. It continues to have increased trade and productivity because both port and urban functions are maintained nearby with hinterland expansion. Meanwhile in the western world, port and city functions are more separated eventually with redevelopment of waterfront as rising concern for environmental issues.



Source: Wilmsmeier et al (2014), updated in Wilmsmeier and Monios (2016)

Figure 2.5 Critical Moments in Port Development

Table 2.6 Spatial Evolution of Global Hub Port Cities in Western and Asian Countries

WESTERN PORT CITY MODEL		Period	ASIAN HUB PORT CITY CONSOLIDATION MODEL	
Primitive cityport Close spatial and functional association between city and port		Ancient-medieval to 19th century		**Fishing coastal village** Small community of natives practice self-sufficient local trade
Expanding cityport Rapid commercial and industrial growth forces port to develop beyond city confineswith linear quays and break-bulk industries		19th to early 20th century		**Colonial cityport** Dominant external interests develop both port and city for raw products exportation and geopolitical control
Modern Industrial cityport Industrial growth (esp. oil refining) and introduction of Ro-Ro and container facilities requires separation and increased space		Mid-20th century		**Entrepot cityport** Trade expansion and entrepot function, modern port development from sea reclamation
Retreat from the waterfront Changes in maritime technology induce growth of separated maritime industrial development areas		1960s - 1980s		**Free trade port city** Export-led policy attracts industries using port facilities through tax-free procedures and low labor cost
Redevelopment of the waterfront Large-scale modern port consumes large areas of land and water space, urban renewal of original core		1970s - 1990s		**Hub port city** Increasing port productivity due to hub functions and territorial pressure close to the urban core
General port city Rising environmental concern for intermodal transport, city economy develops alike non-port cities		1990s - 2000s		**Global hub port city** Maintained port activity and new port building due to rising costs in the hub, possible hinterland expansion

Source: Lee, Song and Ducruet (2008, p.380)

Peripheral Port in a Port Hierarchy

Based on the previous review on peripherality, it is seen that geographic and economic locations could implicitly create a core–periphery pattern. This is caused by agglomeration or concentration in particular locations, which could also be influenced by a port's function itself. Historically, large cities in the world exists because of its function as a port city. There is even a 'lock-in' effect where large cities remain to grow even though cheaper transportation access to waters are not becoming a main advantage anymore (Fujita and Mori 1996).

Explanation on the establishment and growth of hub port cities has been explored (Fujita and Mori 1996; Tan 2007; Lee et al. 2008; Lee and Ducruet 2009). However, not all ports are located in cities or concentrated areas and this study is interested on the periphery position. Therefore, since ports could be located in the core/centre and in the periphery, inevitably somewhat a hierarchy is established. In the port research literature, researchers mention the pattern core/centre – periphery as a 'port hierarchy', others also mention them as a 'network'. Peripheral ports in the hierarchy are the opposite end of hub ports or load centres as the core/centre. Thus, is there any measurement or dimension to classify a level of peripherality? To answer this question, the term port hierarchy or network should be explored.

The term 'port hierarchy' is used by Hayuth (1981) to describe the level of differences between larger and smaller ports during initial adoption of containerisation. The larger ones in the hierarchy are the ones with superior physical infrastructure, open to outside information, having large cargo handling and having capital for investment and hence has the urgency and ability to adopt new container handling facilities and changes (Hayuth 1981). Meanwhile, the smaller ones are the ones trying to improve their position in this port hierarchy (Hayuth 1981).

Hayuth (1981, p.162) also describes the process of container adoption in 5 phases, which was established from the development of the US container port system as follows in Table 2.7. He argued that eventually a 'peripheral port challenge' will happen as a result of a 'maturity' in the port system (Hayuth 1981), explained as follows.

> *"The port system structure reaches a greater "maturity," marked by more established ocean trade route networks and inland distribution systems and by a fairly stable hierarchical port structure. The load centres continue to dominate the container traffic; however, the challenge of the dominant ports by some of the smaller ports intensifies. Further development of the load centres faces some constraints. Some ports may lack*

space for expansion. Diseconomies of scale also becomes an important factor" (Hayuth 1981, p.165).

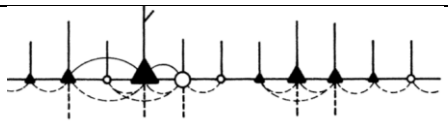
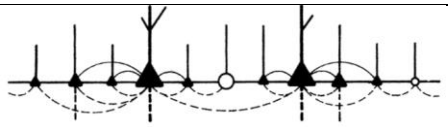
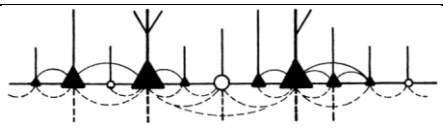
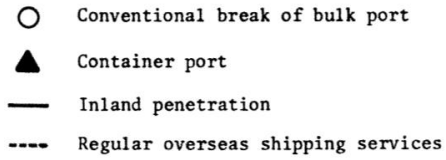
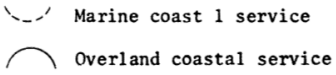
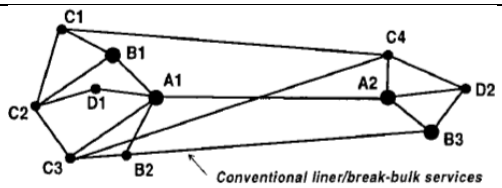
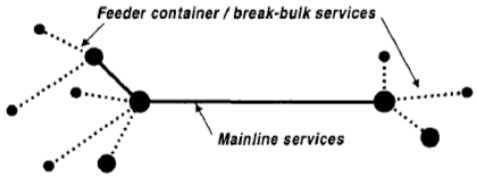
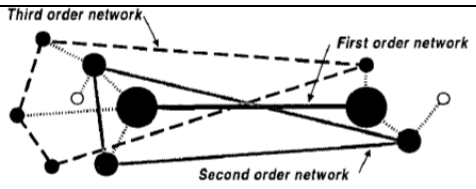
Another way to look at a port hierarchy is not only by looking at the port itself. Robinson (1998) identified a hierarchy as a network of port and shipping, emerging as a result of rapid growth in handling containerised cargo. His model is based on the emergence of hub-feeder networks in East Asia and Southeast Asia in the mid-1990s. Increasing container volumes trigger ports to invest in more capacity and ships to invest larger capacity for reduced per unit costs, hence the network becomes more pressured and restructured into a hierarchy or order (Robinson 1998). Higher levels in the hierarchy are the port-shipping networks with high efficiency/high cost operators which turns into 'mega-terminals', while the lower ones are a mix of hub and direct-call ports focusing on different market segments with the lowest level as feeders described in Table 2.7 on the bottom part by Robinson (1998).

A more detailed hierarchy with descriptions of the core-periphery pattern is identified by Ducruet (2008). His research is based on the experience of North Korea as a close-economic country, which has around 90% of its containers going in and out through South Korean ports. Each of these North Korean ports have different levels of dependency. Ports that are near economic activities such as large cities, hinterlands and industrial complexes, has lower hub dependence upon South Korea (Ducruet 2008). Ducruet (2008) considers direct calls of ships and sea routes as hierarchy, to differentiate low, medium and high dependency towards hubs, as described in Table 2.8.

The hub dependence model by Ducruet (2008) consist of three-stage evolution. First stage is the load centre port which acts as hub, connects with other trading ports by direct call and does not depend on transit ports. The second stage are intermediate ports that cargo goes through before and after accessing the first stage ports. Finally, the third stage are ports that are managing to '*sustain their position'* in the port system as mentioned as follows:

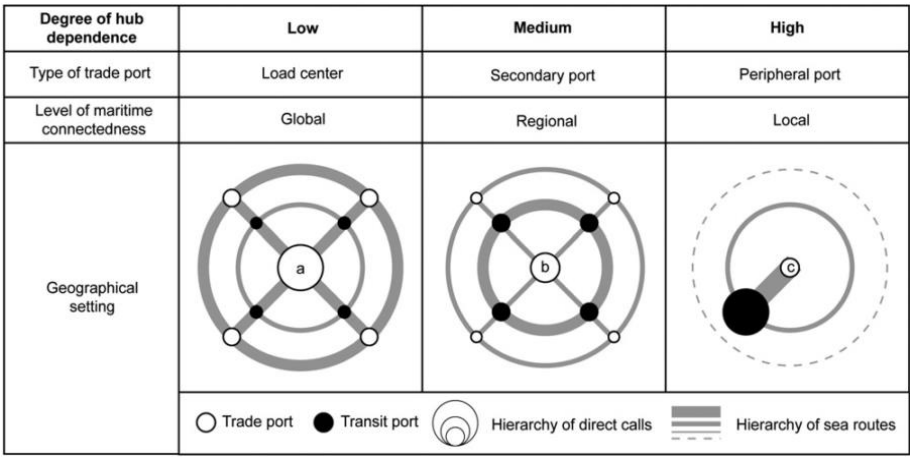
"In the last stage, the secondary port becomes a peripheral port because it connects to the rest of the world through one main hub, which receives the majority of direct calls of larger vessels. While this peripheral port sustains some links with other neighbouring ports, it is not able to handle its own trade flows: those are split among smaller vessels accessing the main hub through feeder services" (Ducruet 2008, p.391).

Table 2.7 Development of Port Hierarchy

Containerisation Adoption Model by Hayuth (1981, p.162)		
Phase-1		Preconditions for change
Phase-2		Initial container port development
Phase-3		Diffusion, consolidated, and port concentration
Phase-4		The load centre
Phase-5		The challenge of the periphery
Legend:		
Efficiency/Cost Model by Robinson (1998, p.34)		
Phase-1		Small increasing volumes emerges in some links.
Phase-2		Networks decomposes into mainline and feeder links, with hub ports as ‘articulation points’.
Phase-3		Networks decomposes further into a hierarchy based on its efficiency/cost level.
Legend:	• A1 and A2: Mega-terminals • B1, B2, and B3: Second order	• C1, C2, C3 and C4: Third order • D1 and D2: Feeders

Source: compiled by Author

Table 2.8 Peripherality in a Hub Dependence Model by Ducruet (2008)



Source: Ducruet (2008, p.391)

However, Ducruet (2008) only explains how the peripheral are dependent on the hubs. More on port networks are explored in Section 2.2 about hub port systems, because most of the literature looks from the point of view of the large hub ports. As stated by Rodrigue and Notteboom (2010), hub port system with services for large vessels have acquired more attention than feeder services, and serving feeder vessels from a port operator's perspective is considered a 'loss of status'. From the shipping line's perspective, they are not mentioned in a hierarchy. However, they can be categorised by the characteristics and scope of their services into tiers. (Baird 2017) developed three strategic groupings for top 20 liner shipping operators by its characteristics and scope of logistics services, as seen in Table 2.9. Respectively from the highest tier are comprehensive global scope, comprehensive regional scope and restricted/limited scope.

Table 2.9 Tiers of Shipping Lines Logistics Services

Tier	Service characteristics/scope	Companies
Tier 1: Comprehensive global logistics services	• Carrier provides almost any logistics service demanded • Logistics services provided virtually anywhere in the world • Logistics service revenues exceed US$3.0 billion/annum • Logistics income amounts to 20-40 per cent of ocean transport income	*Maersk Line; APL; NYK*
Tier 2: Comprehensive regional logistics services	• Carrier provides wide range of logistics services • Logistics services provided mainly in major regions • Logistics services revenues between US$1.0 and US$3.0 billion per annum • Logistics income between 10-20% of ocean transport income	*Cosco; OOCL; MOL; K Line*
Tier 3: Restricted/ Limited logistics services	• Carrier provides restricted/basic logistics services • Logistics service turnover under US$1.0 billion per annum • Logistics income below 10 % of ocean transport income	*MSC; Evergreen; CMA-CGM; Hanjin; CSCL; Zim; CSAV; Yang Ming; HMM; Hamburg-Sud; PIL; UASC; HLCL*

Source: Baird (2017, p.185)

2.1.5 Peripheral Port Challenge

The peripheral port challenge (PPC) is first identified by Hayuth (1981) in ports of the United States in the 1970s, when he saw a pattern that smaller ports are growing as they are becoming early adopters of containerisation. They started to 'challenge' the large established ports. Further on, several researchers analysed this phenomena in other regions of the world (Table 2.10). Ducruet et al. (2009b) used PPC itself to explain how ports are deconcentrating as the opposite of concentrating or agglomerating, and that there is an increasing trend in studies on port deconcentration. More discussion on port concentration and deconcentration in Section 2.4.3.

Table 2.10 Evidence of Peripheral Port Challenge

America	**United States**: Large ports such as Port of New York/New Jersey, Seattle, San Francisco are challenged by smaller ports such as Vancouver, Portland, Tacoma which are early adopters of containerisation in the year 1970-1985 (Hayuth 1981).
	North America: Canada's Port of Prince Rupert and Mexico's Port of Manzanillo, are challenging the west coast port of the USA Los Angeles/Long Beach (Baker 2015).
	Latin America and Carribean (LAC): Secondary ports are emerging, such as Kingston challenging Houston and Port Everglades, also expected further transhipment growth (Ducruet and Notteboom 2012b; Wilmsmeier et al. 2014; Rodrigue and Ashar 2015).
Europe	**Rhine-Scheldt delta**: PPC are not seen in ports in the Rhine-Scheldt delta. Net shifts or losses from large load centres (e.g. Antwerp-Rotterdam) are insignificant except Zeebrugge and that port concentration in the European container port system stagnated in the 1990s (Notteboom 1997, 2005).
	West Medditerranean: Gioia Tauro, Algeciras and Marsaxlokk are challenging Valencia, Genoa and Barcelona because post-panamax vessels need to decrease diversion distance from the main route. Such as (Notteboom 1997, 2005).
	UK ports: Felixtowe and Southampton has an increasing role as transhipment port, there are also deconcentration in traffic hence Teesport and Liverpool are becoming emerging as secondary transhipment port for northern UK (Wilmsmeier and Monios 2013).
	Eastern Medditerranean: More hub ports are emerging with a tight competition between Turkish ports, Greek ports Piraeus and Thessaloniki, Bulgaria's port of Varna, Romania's port of Costanza, because of its strategic location between Europe and Asia (Lowry 2011, 2012).
Asia	**Hong Kong**: Shenzhen ports has a cost advantage compared to Hong Kong such as significantly lower land costs and labour rates. The main players developing in Shenzhen are the same companies operating in Hong Kong (Wang 1998; Slack and Wang 2002).
	Singapore: Although having operational efficiency, Singapore is challenged by Tanjung Pelepas because they refused to give dedicated berths to the world's largest shipping line, Maersk SeaLand. Hence they build and operate their own terminals in Tanjung Pelepas, also followed by Taiwan's shipping line, Evergreen (Slack and Wang 2002).
	Shanghai: Port of Ningbo is challenging Shanghai with better maritime access, connections to interior markets and rail access (Wang 1998; Slack and Wang 2002).
	Chinese ports: The declining concentration of Ports in China in the last 30 years (Wang and Ng 2011; Wang et al. 2012; Wang and Cullinane 2014; Li et al. 2015). Chinese ports are also challenging other East Asian ports such as Singapore, South Korea and Japan (Lee and Rodrigue 2006; Lee and Kim 2009; Wang 2009; Tongzon and Yang 2016).

Source: Author

Counterevidence of PPC is argued by Notteboom (1997, 2005) in Rhine-Scheldt delta, stating that no other ports in the Hamburg-Le Havre range are becoming alternative for the large ports there, except Zeebrugge. Even though they argue that Hayuth's model did not apply there, still port concentration in the European container port system stagnated in the 1990s (Notteboom 1997). This stagnation is caused by the development of shipping industry (technological, organisational or mega-consortia issues), the development of hinterland networks and corridors and infrastructural development related to port policy (Notteboom 1997, p.112).

On the other hand, evidence of PPC continued to be observed. In the mid-2000s, Notteboom (2005) identified PPC in Western Mediterranean, while Slack and Wang (2002) in Asian ports. They argued that deconcentration are happening, however, on different reasons. Notteboom (2005) stressed more on location factors such as diversion distance and upstream/downstream port location. Meanwhile, Slack and Wang (2002) stressed more on institutional factors. Therefore, the following sections will explain location factors, institutional factors and other related factors.

Location factors

Notteboom (2005) mentioned two aspects related to location of ports. First is diversion distance, which he defined as the distance to sail to a hub port of call from the main maritime route (Notteboom 2005, p.176). Large ships are pressured to reduce diversion distance as their scale increases, especially for relay or feeder cargoes. Second is the preference of ships to call at downstream ports compared to inland or upstream ports because of better maritime accessibility and depth of draft (Notteboom 2005, pp.176-177). The extra sailing time to reach an inland port is justified if the ship carries large cargo to the particular hinterland and the inland port of call provides great productivity and value-added services.

These two aspects are seen in new-emerging Mediterranean transhipment hub ports, located on the 'round the world' and 'pendulum' routes, such as Gioia Tauro, Marsaxlokk and Algeciras, which has traffic dominantly transhipment cargo and only less than 10% local cargo (Notteboom 2005; Knowles 2006). The three ports are an example of ports with less than 100 nautical miles diversion distance which captures around 13.2% annual growth of ports located more than 250 nautical miles in the year 1994-1997 (Notteboom 2005, p.179).

Institutional factors

Slack and Wang (2002) on the other hand, confirm the existence of PPC in Asian large ports since rising peripheral ports such as Shenzhen ports, Ningbo and Tanjung Pelepas are

confronting Hong Kong, Shanghai and Singapore. However, they argued that the reason behind PPC phenomena here are different compared to the former American and European point of view. They define institutional factors as '*the roles of the port authorities and terminal operators and their relationship with the shipping lines'* (Slack and Wang 2002, p.164). They argue that this institutional factor emerges because of the recent trend in global/international terminal port operations. In addition this happens in Asia, where regional traffic growth and port development opportunities exist compared to the stable market in Europe and North America. Wang (1998) argues that Hong Kong's case differs from Hayuth's model since hub operators are penetrating to other ports in China.

Within the institutional factors mentioned, it can be seen from two different point of views, first from the port or terminal operator and second from the shipping lines. First, global terminal operators are willing to expand their business in peripheral locations because they identified lower land and labour costs (in Hong Kong's case) also better access to market (in Shanghai's case) (Wang 1998; Slack and Wang 2002). Hong Kong's economy reached maturity earlier in the 1990s hence hub operators wanted to offset the high cost of land and labour to potential Chinese ports (Wang 1998, 2009). Since they already have business in the large hubs, they try to exploit new opportunities from the peripherals with no intentions to take away cargo from their large hub ports.

Second, shipping lines are also putting effort to expand their business by having their own dedicated terminal, with their own standards in facilities and operations as seen in Maersk Sealand and Evergreen's story (in Singapore's case). Congestion, depth of water constraints, diseconomies of scale, distance from shipping lanes as argued in the US and European's case are considered not applicable to either Hong Kong or Singapore, and only partially relevant in Shanghai (Slack and Wang 2002). Therefore Slack and Wang (2002) tries to prove that there is a shift of focus, from physical and operational considerations, with simple administrative and jurisdictional structure before, more into institutional or aspatial considerations.

In addition, there are also other ways for these stakeholders to cooperate institutionally. The purpose of their cooperation is to reduce competition and expand market potential (Song 2002; Lee and Rodrigue 2006; Wang and Cullinane 2014). Song (2002) gave example of port's action to reduce competition by investing in the peripheral port and collaborate, as the case of Hutchinson Port Holdings Group investing in Yantian to reduce competition with Hong Kong. Wang and Cullinane (2014) argued that port policies and government's regional development

strategy should be consistent and coordinated to manage the overlapping hinterlands and to secure long term competitive advantage for the overall port range. Competition between Shanghai and Ningbo should be managed by municipal/provincial government, port authorities, shipping and other stakeholders following the successful strategy implemented on the competition between Hong Kong and Shenzhen (Wang and Cullinane 2014). Meanwhile, not only ports and shipping, even the shippers such as Korean manufacturing companies are also putting their capital to expand facilities in China to enlarge market and reduce production costs which effects reorientation to the maritime industry and port system in the Yellow Sea Rim region (Lee and Rodrigue 2006).

Other Factors

Besides location and institutional efforts, it can be seen from PPC that infrastructural development and eventually improved port performance are also a critical factor. Wilmsmeier and Monios (2013) described that by having new port-centric logistics infrastructure at Teesport, cargo flow which before coming in through UK gateway port and move inland, shift into coming through this transhipment hub port. Transhipment options are split between continental Europe ports and UK ports, and shifting more to UK secondary transhipment hubs shows that there are PPC or deconcentration.

Similar thing happens in the region North America, Latin America and Caribbean (LAC) and East Mediterranean, as described in Table 2.8. In 2014, USA ports grew at 2.6%, while Mexican ports grew faster at 3.5% especially Port of Manzanillo as the second fastest growing port in North America at a growth rate of 11.2% after Canada's port Prince Rupert at 13.8% year on year (Baker 2015). Market share in the west coast ports of North America doubled from 1997 to 2012 while east coast decreased, since exports from China and other parts of Asia to the USA has increased significantly (Wilmsmeier et al. 2014).

Long before in the mid-2000s, Mexico has identified opportunities and upgraded their transport infrastructure. Their strategy is to develop Mexico's ports as alternative gateways to USA's west coast ports and as alternative to Panama Canal (Porter 2005). SSA Mexican port operators and Hutchinson Port Holdings (HPH) tried to establish alternatives to USA's west coast ports such as Los Angeles, Long Beach, Seattle and Oakland (Nelson 2005). Even the incumbent President, Felipe Calderon, promoted optimistically to spend up to $5bn, which consist of $1.1bn to develop land area to be four times bigger than the port of Los Angeles and $2bn for

rail construction, including two rail lines streching approximately 150 km to Mexicali, Yuma, Nogales or El Paso in the USA (Nelson 2008; Manners-Bell et al. 2014).

Wilmsmeier et al. (2014) saw trends from time series data on container movements between 1997 and 2012 in LAC showing increasing patterns of cargo flows and ship's choices to tranship there such as in Colon (Panama), Cartagena (Colombia) and Caucedo (Dominican Republic) (Wilmsmeier et al. 2014). Looking at the port network data between 1996 and 2006, Ducruet and Notteboom (2012b) described changes that Houston and Port Everglades has lowered centrality of to Kingston, Jamaica in the Caribbean as impact of hub-and-spoke strategies. Wilmsmeier and Monios (2016) in their multiple case study of 4 LAC countries, explained that port reform and improvement in technical efficiency is needed, eventhough it compromises loss of power from public to private sector and lack of integrated national transport/logistics policies. Hence, this shows that within the institutional context, there are devolution processes and new investments which improve port performance in the region and brings more deconcentration (Wilmsmeier et al. 2014; Wilmsmeier and Monios 2016).

The evidence of PPC shows that hierarchies underlying the hub/center-peripheral position of a port could change and is not constant. Fraser et al. (2016) compiled four salient factors influencing changes in port hierarchy in Table 2.11. These salient factors identified and compiled by Fraser et al. (2016) are categorised by a main theme or background such as geographical, market or economic, strategic planning and geopolitical reasons. However, it could be seen that these factors could also be categorised by the different stakeholder related. Or in other words, categorise it according to the dynamics and interaction by port operator, shipping lines, cargo owner or market, and government's point of view. In addition, these factors are identified from literature and have not been tested or confirmed with relevant stakeholders in practice.

Therefore, the stakeholder's perception and point of view will be explored further in Section 2.4. More factors beside location, institutional and infrastructure factors, will also be identified to contribute changing port hierarchy, hence a more complete literature categorisation providing compilations of factors/variables will be described in Section 2.4.3. Before going further to the factors details, it should be understood the rise of secondary hub ports from peripheral ports.

Table 2.11 Four Salient Factors Influencing Port Hierarchy by Fraser et al. (2016)

Factors	Sub-factors	Explanation	Sources
Geographical factors	Proximity to main shipping trade routes	Port's distance and remoteness, affecting high transport and production costs they typically attract.	De Langen and van der Lugt (2002), Ball (1996), Slack (2002), Notteboom and Rodrigue (2005), Parola and Veenstra (2008).
	Corridors & proximity hinterland	Port's connection with transport corridors to inland intermodal hubs.	Song (2003), De Langen and van der Lugt (2002), Notteboom and Rodrigue (2005)
Market factors	Port profile demand factors	Port cargo flow orientation, port scale and growth, frequency of vessel visits and connectivity.	Notteboom (2009), Ducruet and Notteboom (2012)
	Port profile supply factors	Port capacity, cost, quality and reliability of services, nautical access, terminal operations and hinterland access	Lee et al (2008), Ducruet and Notteboom (2012)
Strategic factors	Strategic actions of port operators	Port's performance influencing port selection by carriers, also vertical integration between operators and shipping lines to become transhipment or intermediate hubs.	Lirn et al. (2004), Rodrigue and Notteboom (2010), Hall and Jacobs (2010)
	Strategic actions of shipping lines	Shipping line's strategy initiate alliances, operating agreements, slot chartering agreements and consortia to provide more 'loops' in their network and the need of intermediate hubs.	Ducruet and Notteboom (2012), Fremont (2007), Hall and Jacobs (2010), Robinson (2002)
Geopolitical factors		Ports located in stable political environment are most likely to have less business risk and better freight rates.	De Langen and van der Lugt (2002), Jacobs (2007), Ntibarekerwa (2010), Ncube et al. (2011), Chen et al. (2013)

Source : Fraser et al. (2016, pp.149-150)

2.1.6 Rise of Secondary Hub Ports and Direct Call of Shipping Lines

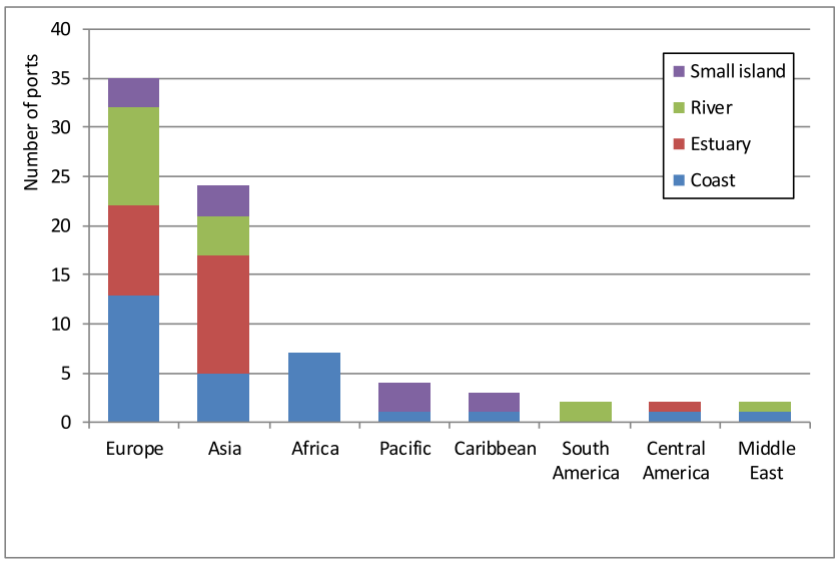
The previous section has explained how developing economies are upgrading their infrastructure to enable more trade and seek opportunities to attract more cargo as regional hubs. This strategy seems simple, however, in reality is more complex. Nowadays, maritime transport industry is also facing a difficult situation. The continued recovery from 2008 economic crisis, the slowdown of global economic growth as a consequence of China's slowdown and oversupply in container shipping capacity, have resulted in continued downward pressure on container freight rates (UNCTAD 2015). Bankruptcy is almost inevitable with the world's top-10 shipping liners, even though there have been mergers or partnerships to sustain in the business (Porter 2016). More uncertainty is also reflected by the changing trend in the use of fossil fuel and rising renewable energy (Thanopoulou and Strandenes 2015). Therefore, investing in the development of ports in more peripheral locations needs to be thought about in more depth. In between peripheral port challenge, developing economies and oversupply in container shipping capacity, meanwhile, hub-and-spoke and transhipment services continues to advance.

This brings us to 'emerging secondary ports' and a recent paper critically relevant to this Thesis, by Monios (2017) titled *'Cascading feeder vessels and the rationalisation of small container ports'*. This main idea of his research article is that major shipping lines are using much more ever-larger ships and these large vessels are cascading down, inevitably down to smaller ports. He questions the future of the world's small ports and whether there are opportunities for them to emerge as 'second-tier hub'. Based on three strands of evidence of peripheral port challenge -- in Wang and Ng (2011) in China, Wilmsmeier and Monios (2013) in the UK and Wilmsmeier et al. (2014) in Latin America; -- Monios (2017) defined rising secondary ports as follows.

> *"…. Able to insert themselves as second-tier regional hubs, between large hub ports and smaller local ports. This role becomes possible because, as container ships on the main routes get larger and container drops at each call increase, hub and spoke and interlining networks become more complex. This process of deconcentration in turn may be expected to lead to concentration at small ports because some will lose traffic to these new second-tier hubs"* (Monios 2017, pp.3-4).

Monios (2017) then identified small ports as ports served by sub-1,000 TEU vessels, identified where they are located in the globe and their main nature type. He used data of world ports from Lloyd's List during November 2014. He found that there are 436 ports in 119 countries, with the majority of countries having 1-2 ports, 20 countries had 5 ports and the rest of the countries has more than 10 ports. These countries having more than 10 small ports are: Japan (43 ports), China (37 ports), Indonesia (22 ports), Spain (20 ports), UK (17 ports), Italy (15 ports), Russia (13 ports), Norway (12 ports) and South Korea (11 ports). Concerning depth of berth, 20 of these world ports has depth less than 7.6 metres, with the status quo nowadays 16 metres is needed for the largest class container vessel. He also grouped the small ports by the nature type, which are small island, river, estuary and coast. The number of ports by its geographical region and nature type is described in Figure 2.6.

Finally, he summarised that there are significant number of small ports with depth restrictions which will be 'severely challenged' by cascading feeder vessels and a 'greater rationalisation' is needed for small container ports to upgrade (Monios 2017). He discussed the main rationalisation are port's infrastructure upgrade and aggressiveness to attract market, so they will not lose investment.



Source: Monios (2017, p.18)

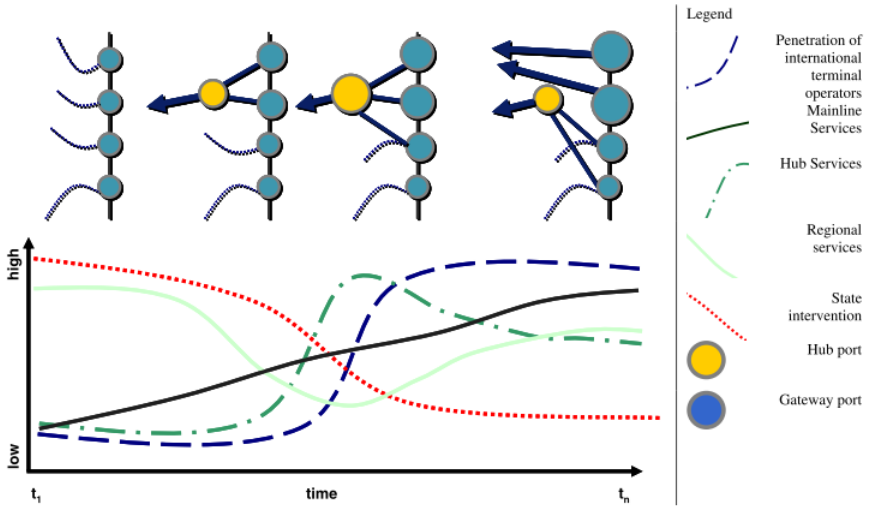
Figure 2.6 Types of Small Ports by Geographical Location and Nature Type

Emerging secondary ports also implies that new direct call from container shipping is coming in to these ports. Halim et al. (2016) defined 'direct maritime connection' as *'a freight transport service from one port to another which is conducted without any transhipment or change in shipping service provider'*. Using the World Container Model, they tried to look at the impact of these emerging direct shipping lines on port flows. Three critical results from their study are: first, direct shipping service linking two ports is predicted to emerge when the cargo volume is more than 200,000 TEU/year. Second, emerging new shipping lines could have a significant negative impact on transhipment in Rotterdam and ports in Bremen-Le Havre range in a high-growth scenario 2040. Lastly, large transhipment hubs such as Singapore and Shanghai could also severely be affected by this trend of direct lines (Halim et al. 2016). They suggested that ports should streghten their links with hinterland to compensate with possible losses of new direct lines (Halim et al. 2016).

Emerging secondary ports and emerging direct call represents how shipping lines influence port development and, vice versa, how port accessibility and performance influence maritime network developments, as described in the study by Wilmsmeier and Notteboom (2011). They studied trade route and network data of West Coast of South America and Northern Europe in 2004-2008. West Coast of South America is selected since it is the least connected region in South America. They argued that the emergence of direct call in liner shipping network has a configuration in a four-phase model, which described how the network evolves in Table 2.12.

Table 2.12 Pattern of Liner Shipping Network Configuration

Phase-1	Phase-2	Phase-3	Phase-4
• Point-to-point direct services with a strong local or regional orientation. • Regional orientation and inter-connectivity to the overseas markets is poor.	• Higher connectivity to overseas markets by consolidating cargo in an intermediate hub. • Increasing dependency to the hub. • Direct regional services start to lose their importance. • Growing connectivity of the port system to overseas markets increases the region's attractiveness to shipping lines & international port operators.	• Port traffic growth leads to a further outreach of the hub-and-spoke network. • The inclusion of new ports. • International port operators further penetrate into the market and state intervention in ports is strongly reduced. • Main lines are growing, smaller regional services start to develop again in a secondary network.	• Market size of specific ports has grown. • Shipping lines started to offer direct services from these ports to overseas regions. • The hub's functional position undermined. • The hub seeks liner service connections to smaller ports which still lack connectivity to overseas market to maintain its role.



Source: Wilmsmeier and Notteboom (2011, p.226)

The four phase model by Wilmsmeier and Notteboom (2011) explains that initially there are point-to-point direct services (phase-1), then shipping lines start to consolidate cargo in an intermediate hub (phase-2). Afterwards, there is an increase dependency to the hub and it is used to create new connections to other ports (phase-3) which means the establishment of further outreach of the hub-and-spoke network. Finally, market size in specific ports grown hence the incumbent hub position is undermined and stronger hubs start to make new direct connections again to new secondary hubs (phase-4). Wilmsmeier and Notteboom (2011) provides important highlights that shipping lines' strategy to avoid unreliable ports, less developed ports on the periphery, and use hub ports as buffer zones to reduce negative impacts on the maritime network. Shipping lines also has strategy to establish alliances to maintain market share, reduce risk and competition.

So far it has been shown that there are many factors needed for peripheral ports or smaller ports to upgrade and become secondary hub ports. These factors discussed in the literature are scattered in various point of view, either from peripheral port's view, large hub ports' view or other related stakeholders in the maritime transport. Hence, now is considered the standpoint of the large container hub ports.

2.2 Container Hub Ports System

One of the most important keyword in this research are 'hub' and 'transhipment' in ports. Before identifying its function, their definitions must be examined first. The definition of hub ports and transhipment will be identified separately.

2.2.1 Definition of Hub and Hub Ports

Definition of Hubs

In the (Oxford Dictionary 2016a), a hub is defined as *'an effective centre of an activity, region, or network'*. From a geographer's perspective, O'Kelly (1998, p.171) defined hubs as *'special nodes that are part of a network, located in such a way as to facilitate connectivity between interacting places'*. Therefore, the terminology can be found in different fields not only in transportation and logistics but also fields related with networks such as computer engineering, for example interactions between computers in a campus network (O'Kelly 1998).

From the perspective of interregional/international trade, Krugman (1993) argued that a location holds the role of a 'transportation hub' if the problem consist of three locations, or in other words, having a hub in between two locations is not reasonable. If that one location has better access to the other two, better than they have to each other, then the superior location will have concentration of production in the increasing returns sector (Krugman 1993, p.34). He described the three locations simple as in Figure 2.7. Therefore, he argued these two main points.

> *"Two simple points: Transportation hubs are favourable locations for industries subject to increasing returns, and that a location's role as such a hub can be self-sustaining, giving a potential role to historical accident"* (Krugman 1993, p.37).

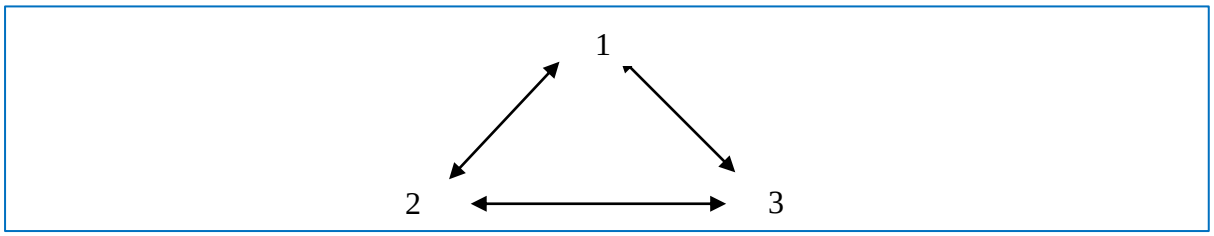
Hubs are also defined as 'articulation points' (Robinson 1998). Hub locations emerge as 'articulation points' or connections, whether it is between feeder shipping and mainline networks in the case of Asian region or between mainline shipping and rail networks in the case of United States (Robinson 1998). The hub-spoke terminology was first used in the airline service, particularly in the United States. Hub-and-spoke operations emerged from

deregulation in United States' airline service in the late 1970s, hence the business players have freedom to determine their own route structure and prices (Borenstein 1992; Hendricks et al. 1997). Most airlines transformed their service into hub and spoke networks, causing interlining traffic to decline, single-carrier hub airports increases, and more concentration occurred (Hendricks et al. 1997).

Further on, since the 1980s 'hubbing' operations have been established by all modes of transport, such as post-panamax ships, wide-bodied airplanes and double stack rail, to take advantage of economies of scale (Slack 1999). The impact of hubs are high traffic/freight concentration from more market areas compared to point-to-point and larger facilities that needs to be provided by terminals such as seaports, airports and rail yards (Slack 1999). Pre-hub flows and hub flows are described by Slack (1999, p.242) in Figure 2.8. In other words, there are a 'bundling' of flows described by Bryan and O'Kelly (1999, p.277) in Figure 2.9.

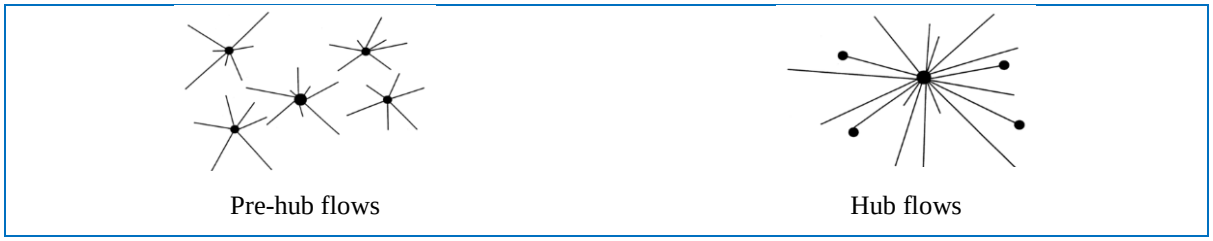
Definition of Hub Ports

Hub and spoke systems are one of the innovations in transport over the last 250 years which brings implications to a time/space relationship studied by Knowles (2006). Other innovations such as cheaper cost, faster speed and reduced transport time resulting from technology is beneficial, though actually added more peripherality to the less developed areas (Knowles 2006). However, in the maritime industry a hub structure is beneficial, providing transhipment operations, which complements direct port-to-port services and not contradictive (Fremont 2007). These operations are described in Figure 2.10.



Source: Krugman (1993, p.30)

Figure 2.7 Threeness in Transportation Hub



Source: Slack (1999, p.242)

Figure 2.8 Pre-hub and Hub Flows

A completely-interconnected-9-node network Hub-and-spoke network

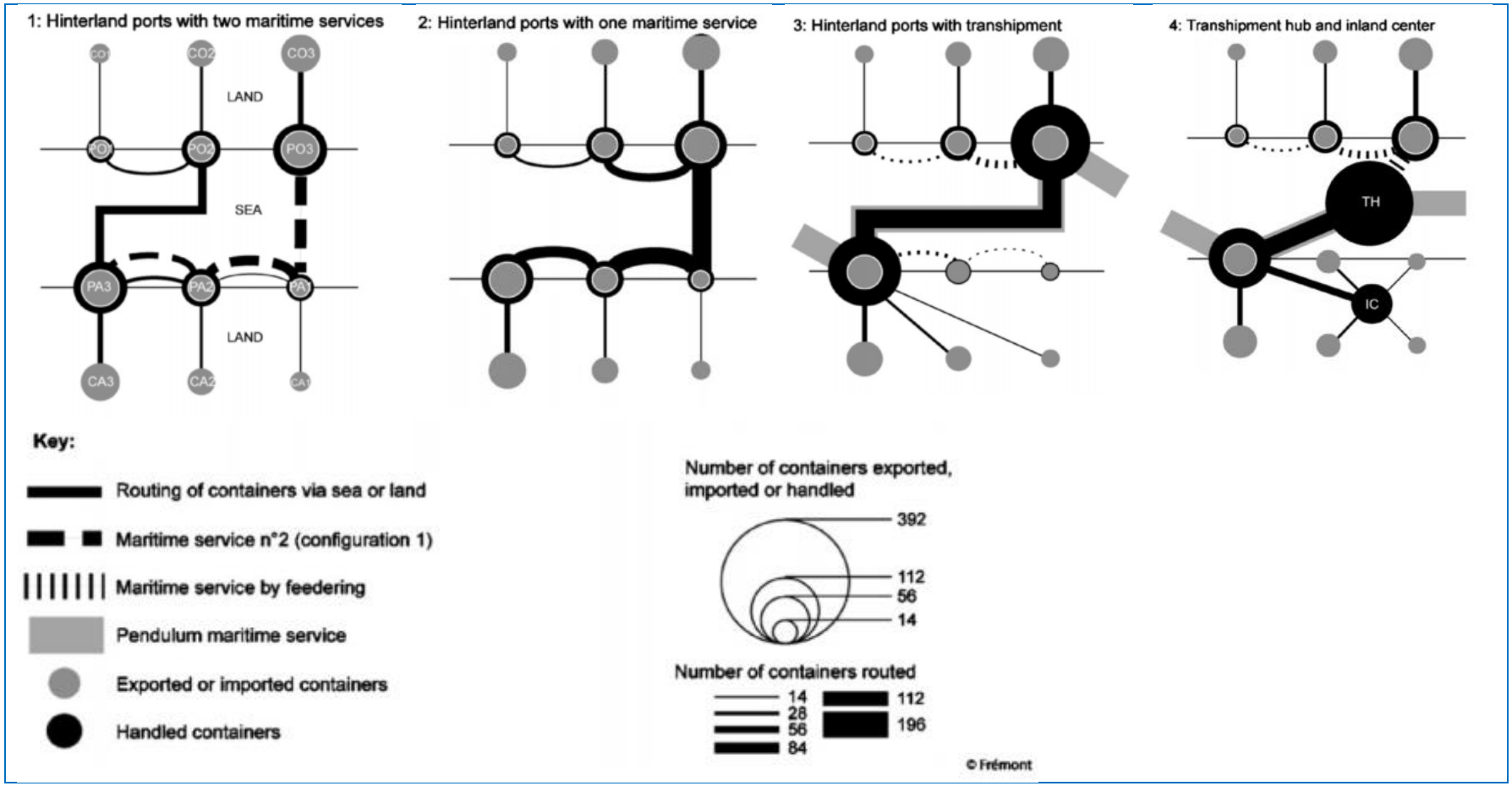
Source: Bryan and O'Kelly (1999, p.277)

Figure 2.9 An Interconnected-9-Node Network and a Hub-Spoke Network

Fremont (2007) explained four different scenarios in maritime and inland configurations. In scenario-1 there are direct services conducted by two maritime services or shipping lines, while in scenario-2 these two maritime services merged into one and enables economies of scale. On the other hand, in scenario-3 and scenario-4 transhipment operations exists between 'PO3' and 'PA3' in Figure 2.10 because of feedering-related operations. These scenarios are taken from the experience of Maersk, the world's largest container shipping line and has created a global shipping network in the last 30 years (Fremont 2007). Maersk's shipping networks reflects an evolution of development taking place since the 1980s which could also reflect the shipping and maritime industry (Fremont 2007). Gouvernal et al. (2011) also asserts that 'container shipping hubs' are a feature brought by shipping carriers to manage distribution of supply chains and optimise the shipping network.

Beside the benefit of hub and feeder structure for shipping, ports that are becoming large hubs are also getting the benefit of high cargo volume. There are common characteristics of hub ports such as enough depth for large ships, proximity to main shipping lines or minimal deviation, and located along the global beltway or equatorial round-the-world route (Rodrigue and Notteboom 2010; Notteboom et al. 2014).

Some of the large hub ports are also known as 'offshore hubs' or 'intermediate hubs' which refers to hub ports located on islands without significant local hinterland, such as those in Freeport (Bahamas), Salalah (Oman), Tanjung Pelepas (Malaysia) and Gioia Tauro, Algeciras, Malta, Taranto and Cagliari in the Mediterranean (Notteboom and Rodrigue 2005). The emergence of offshore hubs, which enables better connection of port and its foreland, are one of the critical aspects in 'port regionalisation' phase of port development (Notteboom and Rodrigue 2005, 2007; Rodrigue and Notteboom 2010). However, there are more to physical characteristics. A summary of hub ports' characteristics is described in Table 2.13.



Source: Fremont (2007, p.433)

Figure 2.10 Four Scenarios of Maritime and Inland Configurations

Table 2.13 Characteristics of Hub Ports

Characteristics of Hub Ports	Explanation	Source
Single or near single-user facility	Pure transhipment hubs are mostly used largely or exclusively by a single carrier or become dedicated terminal.	Notteboom (2011, p.54)
Way-port	Pure hub maximises the port pair combinations that can be generated by interlining of mainline services.	
Minimal deviation	Enables minimum deviation sailing time for mainline vessels from the main maritime route.	
Avoidance of major operational cost	Enables carriers to reduce the number of canal transits and make considerable cost savings, for example hubs emerging in the Panama Canal and Suez Canal.	
Serving small islands	High percentage of transhipment traffic are usually found in small local gateway cargo on islands. For example, Marsaxlokk (Malta), Freeport (Bahamas) and Kingston (Jamaica).	
Low cost	Many hubs are located in countries or regions with lower labour costs compared to the countries/regions they serve via feeder, for example in Freeport (Bahamas) and hubs in West Mediterranean.	
Serves a large number of small markets	Has the ability to serve a large number of small markets, not only the large ones. For example: regional hub ports in the Caribbean.	
There could be more than one hub in a region	• Sea-sea transhipment/mainly hub function: ports in Malacca Straits e.g. Singapore, Port Klang, Tanjung Pelepas • Gateway transhipment: ports in Yangtze Delta e.g. Shanghai, Ningbo, etc. • Both: ports in Mediterranean.	Notteboom et al. (2014)
Common infrastructure and location	Having enough depth for nautical accessibility, proximity to main shipping lanes, stragecig location along global beltway.	
Offshore	Some hub ports are located ‘offshore’ without significant local hinterland, e.g. Mediterranean ports such as Freeport (Bahamas), Salalah (Oman), Tanjung Pelepas (Malaysia) and Gioia Tauro, Algeciras, Malta, Taranto and Cagliari.	Notteboom and Rodrigue (2005)
Having additional features	Labour cost relatively cheaper with no unions, having available land for future expansion, less inland investment since most cargo is transhipped.	
Other ambitious plans	Complemented with logistics zones and Free Trade Zone.	
Ownership	Typically owned by shipping lines or multinational terminal operators which efficiently use these facilities, in whole or partially.	Rodrigue and Notteboom (2010)

Source: Author

Definition of Port as Logistic Hub and Load Centre Ports

In the 21st century, more expectations are given to ports as ports are not only as a hub physically, as gateways or link in intermodal transport, but also a hub in the logistic chain or 'value-chain' (Robinson 2002; Meersman et al. 2005; Mangan et al. 2008; Pettit and Beresford 2009). Robinson (2002) claims that ports become part of a 'value-chain' because of globalisation and more complex business environment explained as follows:

> *"In a new trading environment that is characterized by the globalization of markets, of production, of finance and of distribution; by the corporatization and privatization of third party service providers; by the exceptional fluidity and competitiveness of business environments; by an essentially containerized, relatively medium-to-high value freight context; and by a rapidly and pervasively restructuring logistics or supply chain environment"* (Robinson 2002, p.252).

Logistic hub services provided by ports for example are inland container depots and distriparks (Pettit and Beresford 2009). A more comprehensive discussion on the meaning of hubs in logistics hub and maritime logistics context has been written by Nam and Song (2011). Table 2.14 is their perspective on logistics hub. Nam and Song (2011) discussed the concept of hubs from various logistics and maritime logistics literature, then they proposed their own definition of maritime logistics hub as follows:

> *"A maritime logistics hub is (i) a nodal point of cargo transit or transhipment assuring flawless door-to-door cargo movements, (ii) a principal distribution centre functioning as a temporary storage and sorting and (iii) a place creating and facilitating value-added services on the regional and/or international scale"* (Nam and Song 2011, p.282).

It is seen that transhipment is mentioned again as a keyword in this definition. Do hubs only function as location for transhipment? Further discussion on transhipment, and the advantages and disadvantages of transhipment is discussed in Section 2.2.3. Meanwhile, the port-centric logistics concept was discussed by Mangan et al. (2008), identifying the role of port according to its supply and demand characteristics. These categorisations are adopted from Christopher et al. (2006), whether the products handled has a long or short lead time and predictable or unpredictable demand, to be lean, agile or leagile. These roles are stated as a 'potential revenue generation' for the ports, detailed in Table 2.15 based on categorisation of lead time and predictable demand.

Table 2.14 Perspective on Logistics Hub by Nam and Song (2011)

Perspective	Types	Key Points	References
Traditional logistics and supply chain perspective	Distribution centre/ warehouse	• Place for a physical facility used to complete the procedure for the product line adjustment in the exchange channel • Warehouse for storing finished goods • Facility from which wholesale and retail orders can be filled. • Place where consignments from different origins are grouped and/or split, product flow is controlled in contrast to storage, and value-added services is created • Connecting link between producer-customer.	Rushton et al (2006); Cavinato (1989); Rimiene and Grundey (2007), Johnson and Wood (1996); Bowersox (1968); Lu et al 2008.
Freight transport perspective	Freight village/ logistics node	• Place for transport, logistics and goods distribution functionality. • Provide geographic coverage and facilities which include warehouse and storage are. • Provide for public service and full territory access.	Europlatform (2004); Bhutta et al (2003).
	Freight terminal	• A terminal for freight transport modes change. • Provide a service for handling operation. • Place for value-added service.	Bhutta et al (2003); Roso (2005).
	Dry Port	• Inland location for consolidation and distribution of goods. • An integrated and intermodal extension of ports	Roso (2005); Ng and Gujar (2009)
EDI International facility location perspective	International logistics zone (or international free trade zone)	• Parts of the territory of a state where any goods introduced are generally regarded, in so far as import duties and taxed are exempted. • Space for an arrangement where different trading entities, usually member countries, agree to cut or scrap taxed in order to lower business costs and remove bureaucracy.	Reynaud and Gouvernal (1987); Min and Guo (2004).

Source: Nam and Song (2011, p.274)

Table 2.15 Port-centric Logistics by Mangan et al (2008)

Supply-Demand Characteristics	Resulting Pipelines	Roles for Port
Short lead time + predictable demand	Lean, continuous replenishment	Import: Provision of warehouse close to point of import; Vendor Managed Inventory (VMI); replenishment direct to customer from warehouse at the port. Export: VMI can also be managed at the export port if the sea crossing is short.
Short lead time + unpredictable demand	Agile, quick response	Import: Provision of warehouse space and cross-docking facilities, to allow rapid import, also sorting and distribution of varying product lines. Export: Provision of warehouse to allow suppliers to store goods instead of storing at originating factory.
Long lead time + predictable demand	Lean, planning and execution	Import: Provide berthage space at the port to overcome long lead time and variations in ships arrival times. Export: Provide warehouse or storage facility for export goods, especially for seasonality issues and variations in ship departure times.
Long lead time + unpredictable demand	Leagile production/ logistics postponement	Import: Provision of warehouse with manufacturing capabilities, pick and pack to overcome postponed manufacturing. Export: Capability to handle/store generic, non-customised product.

Soure: Mangan et al. (2008, p.38)

It is seen that the basic roles of a port to adapt different supply and demand conditions are related to berthing space, also storage, sorting and packing. Gouvernal et al. (2011) explains that storage or warehousing is the basic function of logistic hubs, and since it adds cost hence inventory management at smaller number of major distribution centres are needed to be more efficient. Requirements to become logistic hubs are having good transport infrastructure and market access (Gouvernal et al. 2011).

Another terminology used is the port as 'load centre'. Notteboom (1997) acknowledges that the terminology or concept of 'load centre port' is interchangeably used with other terminologies such as 'centre port', 'megaport', 'pivot port', 'hub port' and 'main port'. Particularly 'load centre' implies as the most dominant port within a container port system (Notteboom 1997), also having a significant traffic generated by its centrality besides transhipment cargo (Fleming and Hayuth 1994). Marti (1988) categorised three levels of load centre ports, first which dominantly handles world trade, second handles regional trade and lastly which handles trade in national level. These three levels are not mutually exclusive (Marti 1988).

However, Notteboom (1997) disagrees with this argument since shipping lines have different ways to operate their Round-the-World (RTW) service. Maersk's RTW only concentrates its calls in 7 main load centre ports while Evergreen's calls in 20 load centre ports. Therefore, his criteria for being load centre ports are as follows: *has a regular port of call for Round-The-World services, large container traffic in 1994 exceeds 400,000 TEU, high transhipment figures (feeder ships), and substantial positive shift-effects in more than two of the periods observed* (Notteboom 1997). Notteboom (1997) identified the large load centres in continental Europe are Rotterdam, Hamburg, Bremen, Antwerp, Le Harve, Algeciras and La Spezia. The definitions of hub and hub ports in this section are summarised in Table 2.16.

2.2.2 Classification of Hub Ports

Hub Ports Based on Activity

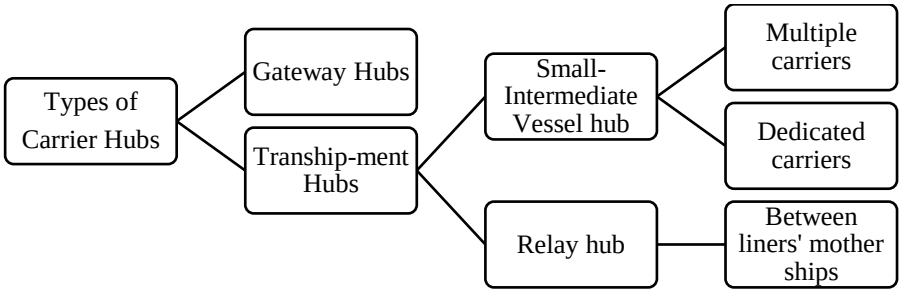
Based on its activities, hub ports could be classified to relay hub, transhipment hub, load centre/gateway hub. Wang (1998) differentiates hub ports as relay hub and load centre. His study is based on the experience of Hong Kong as one of the world's largest hub port (Wang 1998). In the 1970s, Hong Kong played the role as relay hub for the Pacific Asia region, which re-export goods to around 67% from Asian countries, and its main partners are Singapore, Indonesia, the US and Taiwan (Wang 1998).

Table 2.16 Definitions of Hub and Hub Ports

Context	No	Definition of Hub	Source
Geography, Trade, Transport	1	*'An effective centre of an activity, region, or network'.*	Oxford Dictionary (2016a)
	2	Special nodes as part of a network which facilitates connectivity between interacting places.	O'Kelly (1998)
	3	Role as hub when it is connecting minimum 3 locations.	Krugman (1993)
	4	'Articulation point' for feeder shipping, mainline networks, also with land transportation.	Robinson (1998)
	5	Hub operations started in airlines operations in United States late 1970s.	Borenstein (1992); Hendricks et al. (1997)
	6	Hub operations is implemented in other modes of transport since 1980s.	Slack (1999)
	7	'Bundling' of flows.	Bryan and O'Kelly (1999)
	8	Hub and spoke system as innovation in transport, however, could add more peripherality to the less developed areas.	Knowles (2006)
Maritime Transport & Logostics	1	Hub operations enables shipping lines to gain economies of scale and the emergence of feedering operations.	Fremont (2007)
	2	Container shipping hubs to manage distribution of supply chain and optimise shipping network. Storage and warehousing as important activities.	Gouvernal et al. (2011)
	3	Hub ports around the world has similarity in characteristics such as nautical accessibility and proximity to main shipping route	Sources in Table 2.10
	4	Ports as hubs part of a value chain, e.g. having inland container depots and distriparks.	Robinson (2002); Meersman et al. (2005); Mangan et al. (2008); Pettit and Beresford (2009).
	5	A node point for cargo transit, transhipment and other value added facilities.	Nam and Song (2011)
	6	Based on conditions in supply and demand, a port-centric-logistics is concerned with managing berthing space, storage, sorting and packing.	Mangan et al. (2008)
	7	Load centres as most dominant port.	Notteboom (1997)
	8	Ports with centrality.	Fleming and Hayuth (1994)

Source: Author

However, after China's market started to open with the opening of Shenzhen special economic zone in 1978, Hong Kong eventually regained its hinterland and by mid-1990s its role changed to a load centre serving China (ports in China still under-development) (Wang 1998, 2009). Meanwhile, Gouvernal et al. (2011) classifies them into gateway hubs and transhipment hubs as seen in Figure 2.11. They actually mean the same thing with the former handling cargo from its hinterland market, such as Rotterdam, Hamburg and Valencia, while the later handling more transhipment.



Source: From the explanations by Gouvernal et al. (2011)

Figure 2.11 Types of Carrier Hubs

Gouvernal et al. (2011) specifically adds that transhipment hubs could be classified into small-intermediate hubs and relay hubs. Small-intermediate hubs provides service for multiple carriers (e.g in Singapore and Gioia Tauro) also to dedicated/restricted carriers (e.g in Malta, Tranto, Tanjung Pelepas, Tangiers and Caligang). Lastly, relay hub or intermediacy handles cargo between mother ships from different mainline services, such as Maersk's and MSC's ships in Algeciras. Meanwhile, Ducruet (2006, p.20) classified ports by its relationship with the city where its located. He looked at 121 places in Europe and Asia, based on their 'Port-city relationships', then clustered them into 4 type which are: general port cities, hub port cities, hinterland port cities and maritime port cities. They are summarised as follows in Table 2.17.

Hub Ports Based on Types of Cargo

Hub ports has been classified by its cargo type in the study by Ducruet and Itoh (2016). Using Principle Component Analysis, they clustered 17 port and regional variables from 518 ports in 13 countries, which overall counts for 124 port regions. These ports represent 49.9% of total world traffic, with a share of 60.5% of containers, 67.4% solid bulk, 47.1% passengers and vehicles, 36.9% general cargo and 32.9 liquid bulk. Their results are 8 clusters of port region as described in Table 2.18.

Hub Ports based on Size

There are no specific measurements to determine whether a port is considered a hub port. Most port researchers' use port throughput to measure the size of ports. Moreover, for hub ports, transhipment cargo becomes an important measurement. Huang et al. (2008) defined hub ports as a category to differentiate them with other functions, which are trunk port and feeder port. In their study, Huang et al. (2008) used the quantity of transhipment cargo rate instead of throughput cargo rate, to identify five main hub ports in the Asia Pacific region, which are Tanjung Pelepas, Hong Kong, Singapore, Kaohsiung and Busan. Meanwhile, though having large cargo volume, Shanghai and Shenzhen ports are not considered as hub ports.

Table 2.17 Types of Port-Cities

Port-city type	Specific Characteristics	Example
General port-city	• Importance of port functions for the local economy is reduced. • Still favours central place. • Port competitiveness is reduced. • Known as major urban centres.	• Financial poles e.g. Tokyo, London. • National and regional capitals e.g. Bangkok, Helsinki, Copenhagen, Oslo, Dublin, Barcelona, Glasgow, Naples and Leixoes. • Remotely located port cities of the Atlantic Arc and the Scandinavia Baltic.
Hub port-city	• Important port function for the local economy. • Efficient port concentration. • Limited hinterland penetration.	• Southern Europe ports e.g. Lisbon, Piraeus (Athens), Thessaloniki. • Asian port cities dominate this category due to limited hinterlands.
Hinterland port-city	• Important port function for the local economy. • Specialized in industrial and logistic activities which serve large hinterlands. • Lock-in effect of core regions.	• Europe port cities e.g., Le Havre, Marseilles with Paris; Genoa, Trieste with Milan, Turin; Valencia with Madrid). • Asian cases e.g. Busan, Kaohsiung, Taichung and Tianjin, which are also dependent on their close centralized markets (Seoul, Taipei, and Beijing).
Maritime port-city	• Port function limited to urban function. • Urban environment pressures port activity. • Port activity is still kept. • Reclamation is done to overcome risk of congestion. • Geographical advantages and territorial strategies make them different with General port cities.	• Mostly Japanese ports. • Northern Europe estuaries e.g. Maas delta for Antwerp and Rotterdam, Severn river for Bristol, Solent river for Southampton, Seine river for Rouen, Weser river for Bremen and Elbe river for Hamburg.

Source: Ducruet (2006, p.20)

Table 2.18 Different Clusters of the World's Ports

Cluster Number	Cluster Name	Traffic Share (%)	Cluster Profile
1	Industrial centre	36.8	Specialisation in industrial sector with traffic such as solid bulk, containers, outbound, international and degree of centrality.
2	Value-added city-hub	18	Specialised in containers, general cargo, international outbound traffic, important degree centrality, traffic share and hub function. Also concentration of population density.
3	Agri-bulk hub	17.4	Similar profile with value-added-city-hub, with specialisation in primary activities and solid bulk, traffic share and a lower density.
4	Energy centre	10.3	Smaller in population and traffic, mostly domestic import regions for liquid bulk to fuel primary and tertiary activities.
5	Transit centre	<1%	Traffic specialised in passengers and vehicles, tertiary activities, less containers and international outbound.
6	Construction centre	7.5%	Specialisation in solid bulk and inbound flows, small traffic related to construction and urban waste, more peripheral in the network.
7	Metropolitan gateway	8%	Similar to value-added-city-hub with specialisation on containers, general cargo, density and degree centrality. Much richer region.
8	Periphery	1.1%	Very low traffic share, specialises in general cargo, primary sector, low population density, low GDP, low degree cenrality.

Source: Ducruet and Itoh (2016, p.292-293)

Another measurement is by a percentage of transhipment on total throughput used by Notteboom et al. (2014), where ports are categorised into pure transhipment hubs (transhipment incidence above 75%), mixed ports (between 50%-75%) and gateway ports (below 50%). Important gateway ports with a strong transhipment share are dominant in Asia which are Hong Kong (SAR), mainland Chinese ports, besides Pusan (South Korea), Kaohsiung (Taiwan) (Notteboom et al. 2014).

At a more macro perspective, hubs in a particular region could be seen as port concentration, measured by looking at inequality using the Gini index (Kuby and Reid 1992; Notteboom 2006b; Wang and Ducruet 2013; Pham et al. 2016). This index is well known in the field of Economics to measure income distribution inequality by Corrado Gini. These studies also used Concentration Ration, Herfindahl-Hirschman index and Shift-Share analysis to determine whether concentration or deconcentration are happening. The formula to calculate Herfindahl-Hirschman Index (HHI) is explained in Figure 2.12 as follows: *H* represents the concentration index, while *n* represents the number of container terminal in the system. The HHI ranges from *1/n* to 1, and a value close to 1 means that the port system is fully concentrated, dominated by one port or container terminal (Pham 2016).

$$H = \frac{\sum_{i=1}^{n} TEU_i^2}{\left(\sum_{i=1}^{n} TEU_i\right)^2} \; and \; \frac{1}{n} < H < 1$$

Figure 2.12 Formula for Herfindahl-Hirschman Index (HHI)

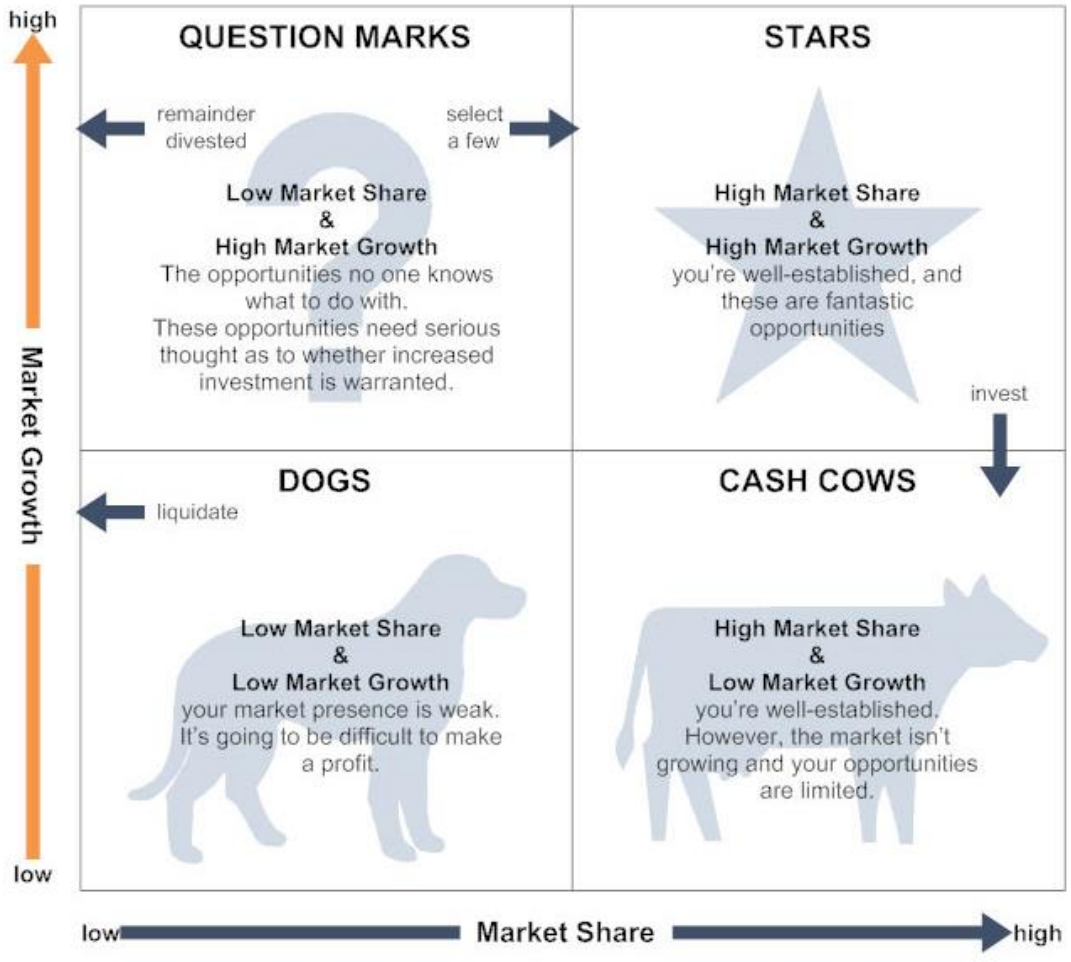
Kuby and Reid (1992) studied measured inequality of container cargo in the United States during the year 1970-1988 and argued that concentration has been happening and contradicts the deconcentration (peripheral port challenge phenomena) by Hayuth (1981). Their reasoning is as follows.

> *"The simultaneous trends of concentration of the liner port system (our results) and deconcentration of the container port system (Hayuth's results) are part of the same story-the diffusion of containerization technology. The diffusion of the new technology brought about the decline of the old technology, but the new technology's economies of scale limited it from spreading to the entire set of ports that had used the old technology" (Kuby and Reid 1992, p.285).*

Meanwhile, Notteboom (2006b) used the Gini decomposition analysis for a comparative study between North American ports and European ports around the year 2000s. Their result shows that the North American container port system has the highest inequality with some port ranges,

especially its southwest range increasingly dominating, while the European port system has a more balanced composition (Notteboom 2006b). Similarly, Wang and Ducruet (2013) used them to describe the concentration in Chinese ports during the year 1868 to 2009 (will be explained in Section 3.2.2). Lastly, Pham et al. (2016) conducted the same measurements in Vietnamese ports which shows that dominant container terminals are in the Northern Vietnam close to the mouth of river and has extra depth to accommodate larger vessels.

A business approach could be used to categorise hub ports by their market growth and market share, well-known by The BCG Matrix (Figure 2.13). It is designed by the Boston Consultant Group in strategic planning to map where a product or company is positioned compared to its competitors. It consists of 4 categories to position them which are as follows: dogs (low share-low growth); question mark (low share-high growth); cash cows (high share-low growth) and stars (high share-high growth). Bichou (2009, p.214) explained that the BCG Matrix could be used in the port sector as an alternative for Product Portfolio Analysis (PPA).



Source: Bichou (2009, p.214), SmartDraw (2018)

Figure 2.13 The BCG Matrix

2.2.3 Transhipment Operations

Definition of Transhipment

Buethe and Kreutzberger (2001) define transhipment as an activity/operation which enables consolidated/bundled cargo flow, from different origins and/or to different destinations, from one transport mode to another. A description of transhipment operations can be seen in Figure 2.14. In transport economics, transhipment operations are costly, however, consolidating cargo and having transhipment operations enables economies of density, scope and scale (Buethe and Kreutzberger 2001). The following explanation describes how transhipment activities work.

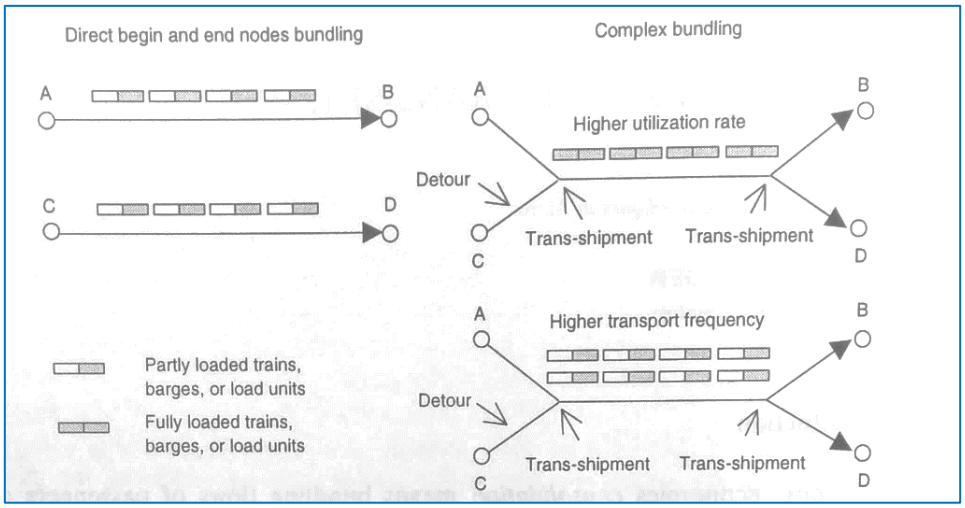
> *"If all origins and destinations were linked by direct transport services, either the frequency or the size of transport units would have to be restricted. This would reduce the service quality and or increase transport costs to unacceptable levels. The higher degree of loading allows benefit to be gained from economies of density. The costs per passenger or container are reduced, as total costs are not proportional to volume transported and can be passed on to more passengers or containers"* (Buethe and Kreutzberger 2001, p.240).

Transhipment operations drives increased complexity and scale of shipping networks. For shipping lines, the use of hub-spoke system or transhipment operations adds cost (and/or time) from extra handling movements in the hub port and costs of feeder services to the end destination (UNESCAP 2007). Shipping lines should constantly balance the cost and benefit between having to tranship in a hub port or to call directly in the cargo's origin/destination port. (UNESCAP 2007).

Besides hub and spoke services, transhipment could also occur in relay services which connects mainline to mainline vessels or deep sea services (Davidson 2014). Cargo freight in a standardised form of containers enables transhipment operations to create 'multiplying effect for velocity', and makes it possible for logistics to shift from supply-based push system to a demand-based pull system (Notteboom and Rodrigue 2008). In supply chain management context, the terminology 'emergency transhipment' means direct transport of goods from manufacturer to customer without consolidation in retailers or warehouses (Hong-Minh et al. 2000).

There is an increasing importance of transhipment operations. Davidson (2014) stated that transhipment operations are critical for shippling lines and with larger ships and alliances

increase the need of transhipment to fill up the ships. UNESCAP (2007) also confirms the increasing use of transhipment hubs since 1990s, the past five years it is in equilibrium state.



Source: Buethe and Kreutzberger (2001, p.240)

Figure 2.14 Transhipment Operations in Cargo Bundling

Advantages and Disadvantages of Transhipment

The advantages and disadvantages of transhipment operations has been discussed in literature, however, these are scattered since different stakeholders experience different consequences. Advantages and disadvantages of transhipment for shipping lines and cargo owners (shippers) are well explained by Fremont (2007) in their study as lessons learned from Maersk Line, the largest shipping line company in the world. It has not explained from the port's point of view.

Therefore, the summary table from Fremont (2007) is adopted here and added with other various sources as follows in Table 2.19. Overall, it is seen that transhipment operations brings more benefit to shipping lines, it has advantages and disadvantages for cargo owners, and more detrimental for ports.

For shipping lines, hub and transhipment enables them to serve a wider geographical coverage or wider destinations, to reach efficiency by deploying ships with different capacities and managing traffic imbalances, and to provide customers more choice of services across the global market (Fremont 2007). The purpose of transhipment is not to minimise cost, however, to serve more market (Gouvernal et al. 2011). Shipping lines operating via main hubs brings easier access to operate across the network, as learned from the case of Caribbean (Marei and Ducruet 2016). However, Cullinane et al. 1999 (cited in Baird 2006) argued that shipping lines continues to provide direct services with large container ships because feedership costs are higher per teu/mile than using mainline ships and economies of scale are not totally lost by multiport calling.

Table 2.19 Advantages and Disadvantages of Transhipment and Direct Service

Transhipment Operations				
	Advantages	**Source**	**Disadvantages**	**Source**
Shipping Lines	-Maritime concentration -More flexibility as regards assignment of the vessel and container fleet -More densely interconnect network -Broader geographical coverage -Economies of scale	Fremont (2007)	-Complex organisation -Possible congestion at the hinterland hub	Fremont (2007)
Cargo Owners (Shippers)	-Possible increase of the number of markets served by the hinterland hub -Possible of freights are cheaper than with direct services	Fremont (2007)	-Longer transit time -Distance from the market -Intermodal transfer adds cost	Fremont (2007), Buethe and Kreutzberger (2001)
Port	-Transhipment cargo brings an increase in profit and development opportunities	Unescap (2007)	-Vulnerable to changes in cargo volume and competition with other transhipment ports -Risk to be less connected or disconnected from the shipping line network -Drop in bilateral export value	Bichou and Grey (2005), Rodrigue and Notteboom (2010), Wilmsmeier and Notteboom (2011), Marei and Ducruet (2016), Fugazza (2015)
Direct Service Operations				
	Advantages	**Source**	**Disadvantages**	**Source**
Shipping Lines	-Direct services -Closeness to the market -Possible if volumes are high on the segment in question -Possible for a niche market, Segmented network -Economies of scale are not totally lost by multiport calling	Fremont (2007), Cullinane et al. 1999 (cited in Baird 2006)	-No concentration -A lot of vessels are needed to ensure high frequency services	Fremont (2007)
Cargo Owners (Shippers)	-Short transit time -Efficient and reliable services if the frequency is high enough	Fremont (2007)	-Low service frequencies if volumes are not high enough -Limited number of markets served -Risk of an expensive service if cargo volumes are low.	Fremont (2007), Wilmsmeier and Hoffman (2008)
Port	-The port is connected in maritime network	Marei and Ducruet (2016)		

Source: Author, modified from Fremont (2007, p.435)

For shippers, transhipment enables them to increase or reach more markets served by the hinterland hub (Fremont 2007). There are also examples in where the cargo owners collaborate to consolidate cargo to a certain volume, hence it enables them to have a dedicated terminal as a consortium and benefit from the economies of scale (Molloy 2017). In the UK, the Liverpoot City Region Local Enterprise Partnership has established a SUPERPORT, which is an integrated cluster of logistics assets and expertise having an aim as follows: *"to deliver faster, greener global market access for business to and from the northern UK and Ireland via an enlarged post-Panamax container port"* (Molloy 2017).

However, trade routes with indirect service leads to higher transportation cost (Buethe and Kreutzberger 2001; Wilmsmeier and Hoffman 2008). Buethe and Kreutzberger (2001) described that in a situation where transport involves changing transport mode or intermodal transport, additional cost occurs which includes money, possible handling damage, information discontinuity and unreliability of schedule. Wilmsmeier and Hoffman (2008) studied shipping lines' direct and indirect services between pairs of countries in the Caribbean and suggested that the impact of transhipment on freight rates is equivalent to an increase in distance between two countries of 2,612 km. Specifically in the Caribbean, they concluded the following.

> *"A less concentrated liner shipping market reduces freight rate for shippers. In a disperse market with low trade volumes on many routes, like the Caribbean, the number of carriers offering direct services in many case exhibits diseconomies of scale and oligopolistic market structure, which in return induces higher transport costs for trade on the respective routes"* (Wilmsmeier and Hoffman 2008, p.149).

Furthermore related to developing countries, Fugazza et al (2013) cited in Fugazza (2015) found that developing countries have more transhipment operations, since average direct maritime connections in developing countries are half of the developed countries. In another study, Fugazza (2015) used shipping data from 2006-2012 and showed that the absence of direct connection correlates with a drop in bilateral exports value of 25%, while additional transhipment correlates with a drop of 25%.

For ports, having transhipment cargoes provides more opportunities. If they succeed, transhipment cargoes supports ports to develop their business at a faster rate than the development of their economic hinterlands permit (UNESCAP 2007). The competition is tough and becoming a hub or transhipment port is vulnerable because they are very much dependent on the cargo itself, either growth or decline, and competition, which are new entrants in the

transhipment market (Rodrigue and Notteboom 2010). Advantages of concentrating cargo in few ports of call is stronger at the level of shipping line because each shipping lines makes different decisions to which load centres are included in their network (Wilmsmeier and Notteboom 2011). Ports should be aware of possible channel conflicts as they can be the subject of footloose arrangements, market and spatial losses (Bichou and Gray 2005). Some ports as part of the network might become less connected, indirectly connected or totally disconnected (Marei and Ducruet 2016).

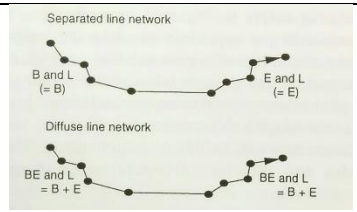
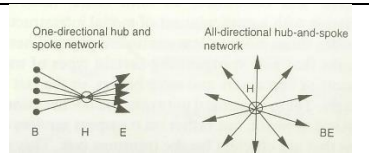
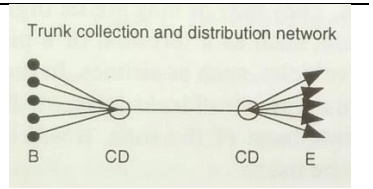
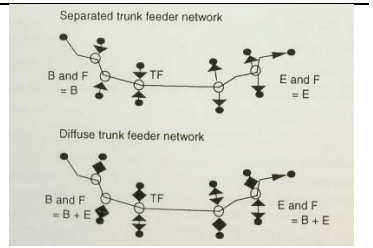
2.2.4 Maritime Network

Since this thesis relates to peripheral and hub ports, it is important to discuss about how they are connected in a maritime network. This section aims to explain about network, maritime network and concepts or terminologies used by researchers in a maritime network.

According to Buethe and Kreutzberger (2001), a network in transport can be viewed in two ways. First is that networks are viewed as a set of physical infrastructures, second is viewed as logistic networks which aims to organise certain type of transport service combined from different carriers. Example for the former are road or rail network, while for the latter is transport of containers. Furthermore, they explained that there are four basic types of network, as described in Table 2.20, which could result in many possible combinations (Buethe and Kreutzberger 2001). Those are line network, hub-and-spoke or consolidation network, trunk collection and distribution network, trunk feeder network.

Maritime networks on the contrary are considered as a ‘late emerging multifaceted concept’, since maritime transport is less studied in a network perspective compared to other modes of transport (Ducruet 2016). In his comprehensive book on maritime networks, Ducruet (2016) introduced why maritime transport in the earlier days were not viewed and studied as networks, mainly because of the following: maritime flows were considered vague, abstract or invisible; continuous decline of maritime transport cost than other logistics cost; maritime traffic data were difficult to obtain and accessed. Nowadays, there are increasing studies on maritime networks.

Table 2.20 Types of Network

Types of network	Link and Nodes	Operations	Modal exchange in Nodes	Example	Description	Explanation
Line Network	Begin and end node, could comprise of several segments	There are restrictions on the service provided	Multimodal	Rail-road, barge-road		
Hub-and-spoke or consolidation Network	A set of links which converge to a main hub	Transfer and bundling of flows	Unimodal	Cargoes between trains, Passengers between airlines		B: begin terminal CD: collection and distribution terminal E: end terminal F: feeder terminal H: hub terminal L: line terminal TF: trunk feeder terminal ● : multimodal terminal ○ : unimodal terminal
Trunk collection and distribution Network	A main trunk composed of several segments, A set of links at begin and end nodes for collecting and distributing loads	Collecting and distributing loads, Size of transport units is smaller on collection and distribution network than main trunk line	Unimodal	Cargoes are collected, travelled inland then distributed		
Trunk feeder Network	Begin or end nodes and intermediate feeder and trunk feeder nodes	Size of transport units is smaller in feeder network than trunk network	Unimodal	Public transport		

Source: Author based on Buethe and Krutz (2001, pp.241-243)

There are six concepts in maritime network that is considered necessary to be understood in this thesis to describe the peripheral-hub port relationship, which are: centrality, intermediacy, site-situation, connectivity, vulnerability and graph theory. The first three concepts relate with a hub port's spatial characteristics, while the latter three could be applied to ports in general. First, on centrality. Fleming and Hayuth (1994) explained that centrality and intermediacy informs how strategically is a location in the transportation system. They also showed examples using airport and seaport traffic in the United States in early 1990s. Centrality means the location is between true origin-destination traffic, from and to a nearby hinterland. Meanwhile, intermediacy means the location is connecting or in the mid journey of the traffic (Fleming and Hayuth 1994).

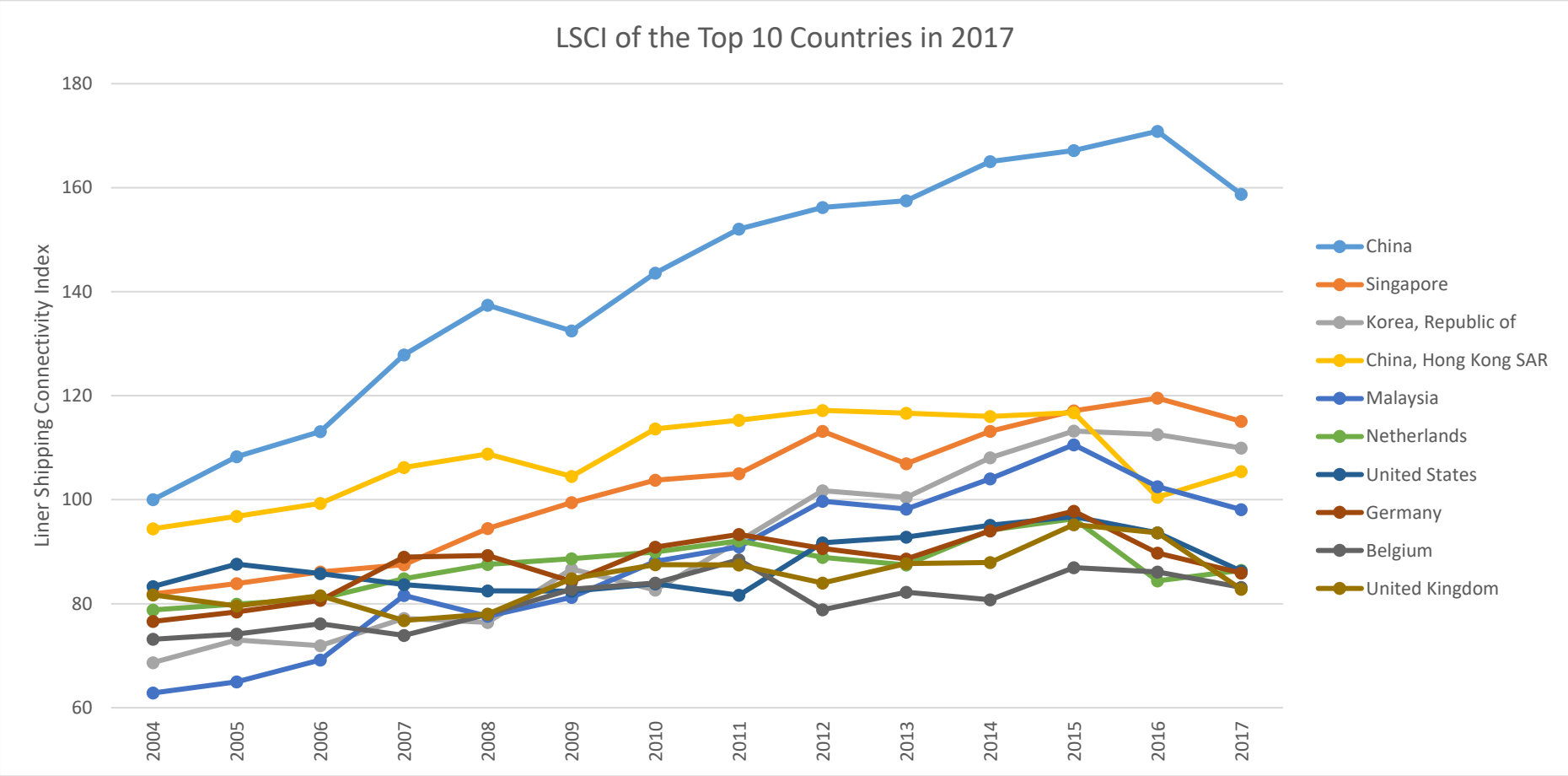
Centrality and intermediacy are overlapping concepts which should be redefined as it is constantly changing (Fleming and Hayuth 1994). Centrality needs to be redefined by changes in scale, whether it is central in regional, national or global lever. Moreover, intermediaccy needs to be redefined even more frequently not only with changes in scale, but also changes in transport technology, government policy, and transport carriers' decisions (Fleming and Hayuth 1994). As example in the east Asian network, Ducruet et al. (2010) identified that Busan and Hong Kong remains as established hubs while Chinese ports are growing, however, these Chinese ports are not increasing in centrality. Lee and Ducruet (2009) compared two major hubs and identified that Hong Kong relies mostly on centrality and gateway functions, while Singapore on intermediacy and hub functions.

Second, on intermediacy. Fleming and Hayuth (1994) added that intermediacy are becoming more important in the current era of integrated global transportation system and total logistics. Krugman (1993, p.36) supported that having centrality does not guarantee a location's hub status, because transporation is an activity related to increasing returns and 'economic space' which is not represented on the map. Third, on site and situation. McCalla (2008) explains other spatial characteristics which is site and situation. Site relates with '*in situ characteristics'* of the location while situation relates with the port location relative to surroundings such as other ports and shipping lanes. McCalla (2008) argues that site factors can be manufactured and that situation factors are more important, since poor site factors can be overcome by favourable situation factors. Site factors includes characteristics on the land, water and interface of land and water. Meanwhile, situation factors includes characteristics related to centrality and intermediacy (McCalla 2008).

Finally, the last three concepts, which are connectivity, vulnerability and graph theory, use more quantitative approaches to describe a port's strategic location. UNCTAD introduced an indicator in 2004 to measure each coastal country's access to regular global liner shipping network serving containerised cargo, known as the Liner Shipping Connectivity Index - LSCI (UNCTAD 2015). There are five components to calculate LSCI, they are: the number of ships; their total container-carrying capacity; the number of companies providing services with their own operated ships; the number of services provided; and the size (in TEUs) of the largest ship deployed (Hoffman 2010; UNCTAD 2015). It represents a country's "connectivity" (Hoffman 2010). LSCI is published by UNCTAD annualy for each coastal country. Figure 2.15 describes top 10 countries by their LSCI in 2017, with China in the first position.

Another indicator for connectivity is developed to measure bilateral countries' connectivity, known as Liner Shipping Bilateral Connectivity Index – LSBCI (UNCTAD 2015). According to UNCTAD (2015), the most competitive routes for direct container shipping services are intraregional in Asia and Europe, with best BLSCI positions are: 51 liner shipping companies connecting Singapore and Malaysia; 46 companies connecting China and the Republic of Korea; and 44 carriers connecting Netherlands and the United Kingdom. Wilmsmeier and Hoffman (2008) argued that not only LSCI, but also together with port infrastructure influences freight rates. High connectivity and a certain level of port infrastructure including berth length, storage capacities, and draft significantly reduces freight rates (Wilmsmeier and Hoffman 2008).

Besides connectivity in measuring access, vulnerability is used to measure a port's share with other ports or port's dependency (Ducruet 2008; Laxe et al. 2012). Vulnerability of a port is calculated using the maximum percentage of cargo that the port shares with other port (Nystuen and Dacey 1961 cited in Laxe et al. 2012). It represents the port's role in the network as a level of hub dependence (Ducruet 2008 as explained in Section 2.1.4) and shows the share of the dominant flow connection within total port traffic (Ducruet et al. 2010). Low vulnerability means it is less dependent, while strong ports are those that diversify the distribution of their traffic, such as Busan and some main Japanese ports such as Yokohama and Tokyo (Ducruet et al. 2010). Lastly, Graph Theory is used by researchers in maritime networks to examine linkeages which represents inter-port shipping movements, relationship between ports, functional status of the port in a group and its importance in local or global level (Ducruet and Zaidi 2012).



Source: UNCTAD (2017, available online at: http://unctadstat.unctad.org/wds/TableViewer)

Figure 2.15 Types of Carrier Hubs

There are various methods in graph theory. One example is the work of Ducruet and Notteboom (2012b) which shows the changing port hierarchies in the global network. They used data port and shipping data from on Lloyd's Marine Intelligence Unit and Tulip software. Data from 1996 to 2006 is used because it is a period which represents the emergence of post-panamax vessel and the start of strategic alliences among shipping lines. Results shows how some global ports have strenghthened position as gateway (e.g. Santos, Brazil and Shanghai, China and the Mediterranean); some are increasing in connectivity (e.g. Gwangyang, Port Klang, Xiamen, Shenzhen in Asia; Marsaxlokk, Gioia Tauro in the Mediterranean); some are decreasing in centrality (e.g. Los Angeles, Houston, New York, Melbourne, Bilbao, North European range ports, Tokyo-Yokohama, Kaohsiung and even Singapore); and some are still having positions as pivotal hubs (e.g. Singapore, Busan, Algeciras, Gioia Tauro) (Ducruet and Notteboom 2012b). Their work is described in Appendix 1 Figure 1.

Another example is Primary Linkage Analysis (PLA) and Multiple Linkage Analysis (MLA) in the work of Cullinane and Wang (2012) and Wang and Cullinane (2014). The linkage value represents available shipping capacity between pairs of ports within a given unit time (Cullinane and Wang 2012). Results shows that Hong Kong, Singapore, Shenzhen, Shanghai and Klang has strong "hub" characteristics hence positioned in the central of the network and other surrounding ports are depedent to them (Wang and Cullinane 2014). Their work is described in Appendix 1 Figure 2.

Meanwhile, Ducruet and Zaidi (2012) uses Complex Network Analysis to describe maritime networks which consist of Graph of Direct Links (GDL) - direct successive calls between ports, and Graph of All Links (GAL) - direct and indirect calls. The aim of their study was to identify communities and bridge ports. Communities are a set of tightly connected nodes which has dense relations with each other compared to the rest of the network, while bridge ports are ports with a low clustering coefficient and has at least one connection with another port located in a distinct maritime region (Ducruet and Zaidi 2012). Bridge nodes are essential because even though they have fewer connections, they are essential for the diffusion of information flows among groups or communities (Ducruet and Zaidi 2012). Results of their study shows that Jakarta (Port of Tanjung Priok) is one of the other bridge ports identified in the GDL 2006 data, together iwht Tenerife, Liverpool, Zeebruggee, Vigo, Callao (Lima) and Penang (Ducruet and Zaidi 2012, p.164). They highlighted that these bridge ports are able to maintain long-distance trading links, even if they lost their central function in shipping networks to gobal hubs (Ducruet and Zaidi 2012). Their work is described in Appendix 1 Figure 3.

The next interesting example is a study by Laxe et al. (2012) using maritime degree, centrality and vulnerability to measure emerging areas in containerised transport between 2008 to 2010, the time of global crisis. Results of their study shows that there are ports in 5 main regions which experience greatest increases in connectivity and centrality, they are: Caribbean sea (Miami, Altamira, Kingston); West coast of America (Lazaro Cardenas); both sides of Panama Canal (Cristobal, Balboa); east coast of south America (Buenos Aires, Rio de Janeiro, Paranagua); Africa (Dakar, Lagos, Durban); Europe (Sines and Felixtowe) (Laxe et al. 2012). Their work is described in Appendix 1 Figure 4. Moreover, they concluded that Indonesian and Arabic hubs during the crisis years become firmly consolidated as priority ports for Europe. They explained Indonesian ports as follows:

> *"the mediation carried out by the Indonesian ports with respect to the movement of containers throughout the pendulum line of the East of Asia-Northern Range would seem to have been consolidated. This is probably linked to the low levels of activity that the container ships of over 10,000 TEUs demonstrate within the sample when compared to the movement undertaken by the Panamax and Post-Panamax feeder fleets" (Laxe et al. 2012, p.43).*

A more recent example is a study by Xu et al. (2015) to look at how the regions of the world are linked, using measures of inequality in the global shipping network. They identified that East Asia remains a powerful trade region in the period 2001-2012. They argued this as more important than centrality and intermediary. Regions with the most declining position are North American West Coast, North American East Coast and Australasia; meanwhile emerging ones are South American North Coast, West Africa, Southern Africa, South American East Coast and West Asia, shown by their growth rates in total traffic volume and connectivity (Xu et al. 2015). Their work is described in Appendix 1 Figure 5. The related concepts in maritime networks discussed in this section are summarised in Table 2.21.

Besides identifying concepts in maritime network, it is also important to look at the real world. Nowadays, Chinese and Asian ports in general dominantly handles the world's container volume. Changes in global trade patterns, the world's largest hub ports, emerging economies and opportunities in becoming hub ports are detailed in Appendix 1. The largest hub ports in the world is shown in Appendix 1 Table 1.

Table 2.21 Related Concepts in Maritime Network

Concepts	Definition	Source
Centrality	Spatial characteristics of transportation hub describes how strategically is a location in the transportation system whether it is in between true origin-destination traffic in the map.	Fleming (1997), Fleming and Hayuth (1994)
Intermediacy	Desribes whether a location is connecting or in the mid journey of the traffic	Fleming and Hayuth (1994)
Site - Situation	Site as 'in situ characteristics' of a location, while situation is its characteristics relative to surroundings.	McCalla (2008)
Connectivity	To measure each coastal country's access to regular global liner shipping network serving containerised cargo in general (Liner Shipping Connectivity Index), or between two countries (Liner Shipping Bilateral Connectivity Index).	Hoffman (2010), UNCTAD (2015)
Vulnerability	To measure port's share with other ports or port's dependency, with low vulnerability meaning it is less dependent.	Ducruet et al. (2010), Laxe et al. (2012)
Graph Theory	To examine linkeages which represents inter-port shipping movements, relationship between ports, functional status of the port in a group and its importance in local or global level.	Ducruet and Zaidi (2012), Ducruet and Notteboom (2012b), Laxe et al. (2012), Cullinane and Wang (2012), Wang and Cullinane (2014).

Source: Author

2.3 Stakeholders in Maritime Economics and Willingness to Invest

Peripheral ports and hub ports are part of a transportation system providing services for the public. However, stakeholders' behaviour to invest in peripheral ports is vaguely explained by the work discussed in the previous two sections (Sections 2.1 and 2.2). Hence, it is explained as follows.

2.3.1 Stakeholders in Maritime Economics

It is widely understood that various stakeholders are involved in Maritime Economics and Transport. The nature of stakeholders in ports has different or even conflicting interests (De Langen 2007). In the case of Rotterdam port, De Langen (2007) identified port stakeholders into 8 categories by their interest and influence which is useful to develop best practices for port management. The main 8 stakeholders are: port labour, transport firms including terminal operator, manufacturing industries, end user of port, local environmental groups, local residents, local and regional government, lastly national government (De Langen 2007, p.461).

Meanwhile, Lin (2015) identified the main stakeholders in maritime logistics network using Social Network Analysis. Results of his study shows that there are 4 main stakeholders, i.e. cargo owner; shipping carrier; ocean freight forwarder and port operator. Moreover, shipping carrier is identified as the integrator of the network (Lin 2015). Moreover, inclusion of stakeholders in the maritime transport could improve long-term strategic planning as suggested

in Dooms et al. (2013) and improve port performance measurement as suggested in Ha et al. (2017).

Dominantly, studies have shown the power of shipping liners compared to other stakeholders since shipping lines are able to select the ports to be in their network. However, in different setting this might not be the case. When it relates with smaller ports or regional ports, then not only private sector is involved, inevitably lower tier local government are also involved (Debrie et al. 2007). The governance of small ports in Canada and France shows that there is no standard model, instead a diversity of governance and partnerships emerged (Debrie et al. 2007). For emerging ports in Asia, Wang and Slack (2004) developed a conceptual framework for port development in a regional context from the case of China's ports in Yangtze River Delta. They found that shipping lines and international terminal operators does not have as much power as in port development in the western world (Wang and Slack 2004). This is also supported by Lee and Flynn (2011), which found that government has critical role in major container port development in Asia providing cross-subsidization, strategic and administered port pricing mechanisms. Various stakeholders identified in relevant Maritime Economics studies are compiled in Table 2.22.

2.3.2 Willingness Studies

Besides identifying stakeholders in Maritime Economics, in this section the concept of 'willingness to invest' is put forward. Willingness-to-pay (WTP) studies emerged from the field of Economics, e.g. Samuelson (1954); Bohm (1972); Johansen (1977), to understand consumer consumer preferences for public goods (Heydt 2008). Samuelson (1954) explained it as 'public expenditure' and 'collective consumption of goods' because if the public good is consumed by an individual, it does not substract another individual's consumption of the same good. A collective decision making system is needed because individuals as consumers in a group or society might hope to become a 'free-rider', to benefit from the costly public good (Johansen 1977).

In willingness studies, consumers are asked about their personal preference for a particular public goods. Nowadays, willingness concept and measurements are not only used in Economics. Table 2.23 describes example studies of willingness across different field such as public policy, development studies, environment studies, health and psychology.

Table 2.22 Studies in Maritime Economics using Different Stakeholder Point of Views

Topics and Authors	Stakeholders									
	Port	**Shipping / Carrier**	**Shipper/ Cargo Owner**	**Forwarder /Logistics Co**	**Govern-ment**	**Local Goverm.**	**Academician**	**Shipowner**	**Environm. groups**	**Financial institution**
Peripheral Port										
McKinnon (1992)			V	V						
Debrie et al. (2007)					V	V				
Port Selection										
Murphy et al. (1992)	V	V	V	V						
Nir et al. (2003)			V							
Lirn et al. (2004)	V	V								
Ugboma et al. (2006)				V						
Guy and Urli (2006)		V								
Chang et al. (2008)		V								
Wiegmans et al. (2008)		V								
Tongzon and Sawant (2007)		V								
Tongzon (2009)				V						
Kim (2014)	V									
Nazemzadeh and Vanelslander (2015)		V	V	V						
Yang et al. (2016)	V	V				V				
Yang and Chen (2016)	V	V		V						
Port/Ferry &Carrier Selection										
Mangan et al. (2002)		V	V							
Tiwari et al. (2003)			V							
Port Service Quality, Performance, Competitiveness										
Ha (2003)		V								
Song and Yeo (2004)	V	V	V	V			V	V		
Yeo et al. (2008)		V		V						
Yuen et al. (2012)		V	V	V						
Feng et al. (2012)	V	V	V							
Woo et al. (2013)	V	V		V						
Maritime Stakeholder Relationship										
De Langen (2007)	V	V	V	V	V	V			V	
Lin (2015)	V	V	V	V						
Port Attractiveness										
Fraser and Notteboom (2014)	V	V		V						
Gohomene et al. (2016)		V								

Source: Author

Table 2.23 Studies with Willingness Concept

Category	No	Study on Willingness	Source
Economics and Public Policy	1	Willingness to pay and willingness to accept.	(McConnell 1977; Hanemann 1991; Jason F. Shogren 1994)
	2	Willingness to invest using non-linear fuzzy logic, case of Sweden.	(Lindstrom 1998)
	3	Willingness to change and implement policy.	(Metselaar 1997; Tummers 2009; Tummers et al. 2012)
	4	Trade-off between security checking and willingness to use rail travel in UK	(Potoglou et al. 2010)
Peripheral, Rural locations or Developing Countries	1	Willingness to pay water service in developing countries, case of Southern Haiti.	(Whittington et al. 1990)
	2	Willingness to invest or pay tax in peripheral or rural locations.	(Flora and Flora 1993; Van de Walle 2002; Schmidt et al. 2013)
	3	Willingness to invest in rural public services, the case of rural China.	(Li et al. 2006)
	4	Willingness to pay for transport externalities in less developed countries.	(Ortuzuar et al. 2000)
	5	Willingness to move to a peripheral port, the case of Montreal and New York	(Guy and Urli 2006)
Environment	1	Willingness to pay for a certain product, e.g. fair-trade in the case of coffee, market segmentation in the case of Spain's organic products.	(Gil et al. 2000; De Pelsmacker et al. 2005)
	2	Willingness to pay based on 'cheap talk', case of golden rice.	(Lusk 2003)
	3	Measuring willingness to pay with follow up dichotomous choice questionnaire.	(Cameron and Quiggin 1994)
	4	Willingness to pay for a certain service, e.g. green electricity, good quality water, drought mitigation in Eastern Indonesia.	(Carson and Mitchell 1993; Pattanayak and Kramer 2001; Roe et al. 2001; Nomura and Akai 2004; Hansla et al. 2008)
	5	Willingness to pay or do something for the environment, e.g to improve from land reclamation and address climate change.	(Michael and Pearce 1989; O'Connor et al. 1999)
Health and Psychology	1	Willingness to pay for a particular health service, e.g. mortality risk reductions, quality life, maternity care.	(Donaldson et al. 1998; Krupnick et al. 2002; Shiroiwa et al. 2010)
	2	Willingness to pay for public goods.	(Kahneman et al. 1993)
	3	Peripherals in psychology as willingness to work in a group.	(Jetten et al. 2003)

Source: Author

2.3.3 Willingness in Maritime Economics

In transport research and maritime economics, the willingness concept has not been used explicitly. Various studies have been done on port selection (which port should be called at) by shipping lines and shippers, which are explained further in Section 2.4.3. One of the most relevant example is the study by Guy and Urli (2006), on the shipping line's selection between Port of New York and Montreal in terms of the port's quality of infrastructures, cost, service and geographical location. Here Montreal is considered as more peripheral of New York.

Results shows that for Montreal to become the preferred choice, extensive hinterland coverage also port's competitive price and service are critical (Guy and Urli 2006).

Another study on willingness of carriers, ports and shippers to transport cargo in a maritime transport chain or network by Talley (2014) using mathematical modelling. His assumptions are that stakeholders are willing to transport cargo if certain conditions apply. His study concluded as follows: "(*1) a carrier's (water and land) chain profit has positive direct and positive indirect effects on the carrier's choice of a maritime transport chain, (2) a port's chain throughput has positive direct and positive indirect effects on the port's choice of a maritime transport chain, and (3) a shipper's chain logistics cost has negative direct and negative indirect effects on the shipper's choice of a maritime transport chain*" (Talley 2014, p.174).

Furthermore, timing is a critical aspect in port development. Wilmsmeier and Monios (2016) highlighted that in the maritime transport, first-mover advantage is critical since a delayed action caused by a time-lagged investment or development may no longer be suitable to a new state of the system. This implies that one's action or one's willingness to invest in an infrastructure might make a difference to the whole system. Therefore, it is necessary to adopt the willingness concept in this study. Not only to understand the factors needed for a peripheral port to become a hub, but also to understand whom are willing to make the first move to invest in more peripheral locations.

2.4 Development of Conceptual Framework

2.4.1 Research Gaps and Research Questions

Based on the literature review, research gaps are identified and translated into research questions to be answered in the Thesis. Three main themes or ideas that are identified as research gaps are as follows:

First, on the concept of peripherality. In Section 2.1, its definition was identified from a general context in development, geography and economics, until specific context in maritime transport and seaports. The disadvantage and advantage of peripherality, peripheral port challenge and position in a port hierarchy was also explored. However, there are areas which is still understudied on engaging peripheral ports in the business. There is a contradiction on the hub-periphery relationship. The hub dependent model by Ducruet (2008) only explains how peripheral ports are dependent on the hubs without explaining the hub's dependency on its feeders, the second, third stage or peripheral ports to supply the cargo volume.

On the contrary, the hub port concept contradicts this since being a hub or transhipment port are vulnerable because they depend on cargo volume (Dunbar-Nobes 1984; Ducruet et al. 2010; Rodrigue and Notteboom 2010). Therefore, which are actually the ones being dependent, or are they interdependent? It is unclear how peripheral ports are perceived by relevant stakeholders in the context of maritime economics, what are levels of peripherality, what are characteristics of a potential peripheral port, the potential benefits of peripheral ports and who are the main stakeholders in peripheral port development. Therefore, the first research question (RQ1) is: ***What is peripherality in the context of maritime economics?*** A qualitative research approach is needed because qualitative interviews enables the researcher to explore stakeholder's perceptions.

Second, on the hub-peripheral port concept. Many variables were explained related to the development or formation of hub ports, different areas of research related to hub ports, deconcentration and concentration of hub ports and also trends of peripheral port challange (explained in Section 2.1.5). Critical questions arise for the development of ports in more peripheral locations. Are port concentration and deconcentration deriving the pattern from liner shipping network configuration? How to manage concentration and deconcentration occurring? What is the dominant factor driving both concentration and deconcentration? Are there changes in identifying which peripheral ports have potential?

Moreover, there is still a gap on how to capture opportunities of growth, especially in the case of Indonesia as an archipelago country, and concentration-deconcentration factors needed. Further empirical data should be collected and analysed to identify what the critical factors are for successful hub ports. Therefore, the second research question (RQ2) is: ***What are the underlying concentration and deconcentration factors for developing a successful hub port in a peripheral location?*** Both approach qualitative interviews and quantitative questionnaire survey will be used to answer this.

Third, on critical factors. The literature provides all factors that are influencing whether concentration or deconcentration to happen. However, it is not clear which is the critical factor, how different types of stakeholder perceive which are the critical factors, and how transhipment services or other value-added services should be provided. Hence, the third research question (RQ3) is: ***What are the critical factors to develop hub port in a peripheral location for each stakeholder?*** Both approach qualitative interviews and quantitative questionnaire survey will be used to answer this.

Fourth, on the main players or stakeholders. Since port research has different purposes, whether they are to bring benefit for the port operators, shipping lines, shippers or cargo owners (explained in Section 2.3) and that these stakeholders in the port cluster have different or conflicting interests (De Langen 2007), it is still unclear about the main players and their interest in peripheral port development. Further empirical data should be collected and analysed to understand how important peripheral port development is, what is their willingness is to invest in peripheral ports and which main stakeholder should be the coordinator or integrator. Therefore, the fourth research question (RQ4) is: ***What is the stakeholders' willingness to invest in peripheral ports?*** Both approach qualitative interviews and quantitative questionnaire survey will be used to answer this. Overall, these four themes identified as gaps in literature are translated and detailed into research questions, sub research questions and research approach to answer them as shown in Table 2.24.

2.4.2 Stakeholders in the Thesis Research

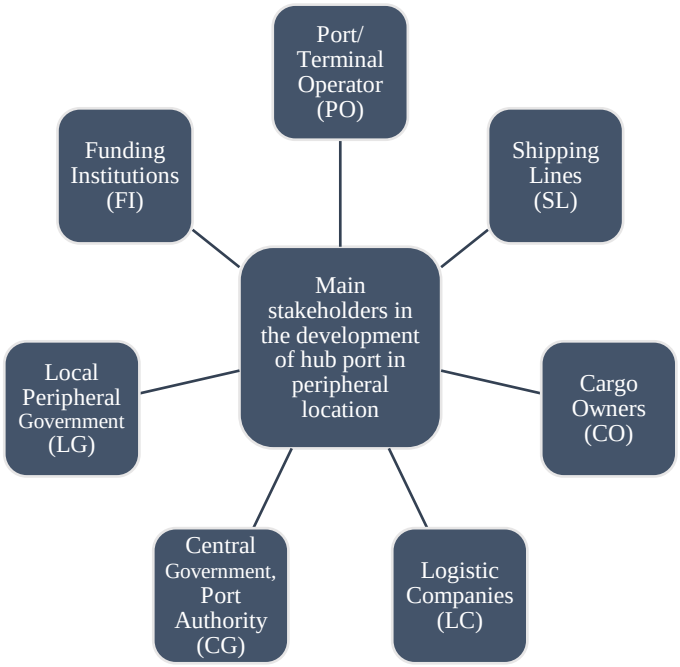
Various stakeholders identified in relevant Maritime Economics studies has been shown in Table 2.22. To identify stakeholders in the context of Indonesia's maritime transport for this Thesis, Preliminary Interviews are conducted by the Author to a port operating company (See Appendix 2). There were various stakeholders mentioned in the preliminary interviews, compiled in Table 3 in Appendix 2. Findings from preliminary interviews shows that there are 7 stakeholders of the port company. First are other port companies. Relationship between port operators could be competitive, cooperate or neutral. Next are shipping lines, cargo owners and logistics companies, who transports the cargo physically, either they are international or domestic companies. Next are the central government, ministries and local government, who has formal relationship with ports in Indonesia which are state-owned. Last are financial institutions, who are related to the funding for port development.

These 7 stakeholders are compared with stakeholders in Table 2.22 and mapped using the stakeholders model by Friedman and Miles (2002) (explained further in Section 3.1.7). Finally, it is decided that these 7 stakeholders as the most relevant parties to become participants in data collection of this study. Figure 2.16 describes the stakeholders for the thesis. Further explanations on these stakeholders and how it aligned with Stakeholder Theory as the theoretical lens of the Thesis is explained in Section 3.1.7

Table 2.24 Identified Research Questions

Research Question	Keyword	Sub Research Question	Proposed Research Methods	
			Qualitative	Quantitative
RQ1: What is peripherality in the context of maritime economics?	Perception of peripherality	a) Are there certain levels or degrees of peripherality? b) What are considered as potential peripheral ports? c) What are potential benefits of peripheral ports? d) Who are the main stakeholders in peripheral port development?	V	-
RQ2: What are the underlying concentration and deconcentration factors for developing a successful hub port in a peripheral location?	Factors Needed	a) What are the concentration-deconcentration factors needed? b) What are the concentration-deconcentration factors in Indonesia's port development?	V	V
RQ3: What are the critical factors for each stakeholder?	Critical Factors	a) What are the concentration-deconcentration factors for each stakeholder? b) How should transhipment services or other value-added services be provided?	V	V
RQ4: What are the stakeholders' willingness to invest in peripheral ports?	Willingness	a) How important are peripheral port development for each stakeholder? b) What are their willingness to invest in peripheral ports? c) Which main stakeholder should be the coordinator or integrator in peripheral port development?	V	V

Source: Author



Source: Author, adopted from Friedman and Miles (2002)

Figure 2.16 Mapping of Stakeholders in Preliminary Interviews and Final Stakeholders Selected for Thesis

2.4.3 Selection of Most Related Studies and Variables

The reasons why hub ports have been developing from time to time have been discussed in abundant port studies and literature, even since containerisation started. These studies are compiled and categorised into 6 main themes in Table 2.25. The main 6 themes in literature are still using terminologies or expression by the researchers itself. The identified themes show that literature is still dominanated by the context of large hub ports or load centres. However, there is a growing literature on peripheral port challenge, development of peripheral ports and ports in emerging economies.

Table 2.25 Themes in Literature on Development of Container Hub Ports

No	Development of Container Hub Ports	
	Themes in Literature	**Definition**
1.	Concentration Factors	Factors or variables which explains the formation and concentration of cargo in hub ports.
2.	Deconcentration Factors	Factors or variables which explains 'peripheral port challenge' and deconcentration of cargo from existing hub ports.
3.	Port Performance and Competitiveness Factors	Factors or variables which explains performance, competitiveness and others making a port worth to become a hub.
4.	Hub Location Factors	Factors or variables which explains reasons why hub ports should be developed in a particular location and the attractriveness of the location.
5.	Port Selection Factors	Factors or variables which explains why shipping lines and other stakeholders select a particular port to be their port of call.
6.	Willingness to Invest	Factors or variables which explains why a particular public goods is more preferred by consumers.

Source: Author

Concentration Factors

Concentration factors are the next theme in literature which explains the formation and concentration of cargo in hub ports. Both concentration and deconcentration factors have been identified by port researchers in order to understand the reasons why agglomeration or dispersion of cargo volume happens between these hub - peripheral ports. In other words, they are the factors underlying the emergence of secondary hubs. Hoyle (2000) mentioned that port researchers have long recognised port concentrations as a trend. He mentioned that sea traffic tends to concentrate and hence the growth of effective ports are less (Sargent 1938 cited in Hoyle 2000). Notteboom (1997) concluded from the work of Barke (1986), Hayuth (1988) and Kuby and Reid (1992) that there is a tendency to port concentration and moreover it will eventually reach a limit or develop into deconcentration.

The key study which compiles concentration – deconcentration factors, which is also the a critical study as the basis of this thesis research is the work by Ducruet et al. (2009b). They interpret concentration as a result of path-dependency of large agglomeration from port cities or efficient load centres. Their example is New York for the former and Hong Kong for the latter. In their work, various studies are gathered from the year 1963 to 2008 related to concentration and deconcentration. Ducruet et al. (2009b) compiled these factors and argued that there is a shift from concentration to deconcentration studies.

Even so, literature written from the point of view of the periphery is still under-studied and there is a need to update these factors from studies beyond 2008. This part of the section aims to update the work by Ducruet et al. (2009b) based on further work by Wiradanti et al. (2017). Wiradanti et al (2017) showed that concentration and deconcentration factors are categorised in specific time periods. Hence, it can be seen that these factors evolve over time and identify a future research agenda for peripheral ports.

A chronological review describes how the subject matter has evolved over time periods, in which theories have been developed, tested and refined (Carnwell and Daly 2001). A chronological review brings an advantage to present findings of a literature review in a clear and consistent way, besides categorising it by themes, by different methodologies or by different theoretical/empirical type (Carnwell and Daly 2001; Cronin et al. 2008). In port literature, example of a chronological review is the study by Beresford et al. (2004) describing transition process and development of European ports during 1960s to 2000s, and by Lee et al. (2008) describing evolution of port issues in Western and developing countries. Here the

concentration and deconcentration factors are divided into time continuum between 1970 - 1990, 1990 - 2008, and after 2008. These periods are chosen because it reflects the maritime industry respectively: the period of early container adoption (Period 1: 1970 – 1990); growth of containerisation, improvements in shipping technology and globalisation (Period 2: 1990 – 2008); and after the 2008 crisis or recession (Period 3: 2008 onwards).

The following Table 2.26 are concentration factors compiled by time period. The table shows how certain factors emerge from each period and continue to be discussed in the next period or come to a halt. Before 1970, ports concentrated in locations with established inland transport corridors (Taaffe et al. 1963; Rimmer 1967b, a). Afterwards, development of load centres, consolidation and intermodal facilities were considered the reason concentration occurs (Hilling 1977; Hayuth 1981, 1982; Slack 1985, 1990). It was not discussed further in the following periods since later on it is considered as deconcentration factor.

In period-1, there are three factors which were continued to be discussed in the next periods: a) port city dominance; b) economies of scale, stable structure and port hierarchy; c) regional integration and hinterland penetration. **First, on port city dominance**. Ports prepared for large volume of container handling were large port cities such as New York (Kenyon 1970) and sustained ports in Nigeria (Ogundana 1971). These port cities has large-scale operation in transshipment, wholesale distribution, efficient handling of containerised cargo which was still in early adaptations (Kenyon 1970). Further on in period-2, more concentration is based in port city dominance and existing hub dominance (Hoyle 1999; Brunt 2000; Ducruet 2008), whereas in period-3 they are mentioned as large hub port cities with reputation and market power (Lee and Ducruet 2009; Notteboom 2009b; Yang and Chen 2016). Reputation is built and maintained with stakeholder relations management (Notteboom 2009b). Moreover, criteria to become these global hub ports are not only cost related to transport and stevedoring, but also convenience of customs clearance, cost of land, investment system and incentives (Yang and Chen 2016).

Table 2.26 Concentration Factors in Literature Since 1970

Period-1: 1970-1990	Period-2: 1990-2008	Period-3: After 2008
• Development of load centres, consolidation, intermodal facilities Hilling (1977), Hayuth (1981, 1982), Slack (1985, 1990)		
• Port city dominance Kenyon (1970), Ogundana (1971)	→ • Port city dominance and existing hub dominance Hoyle (1999), Brunt (2000), Ducruet (2008)	→ • Hub port cities, reputation of large existing hubs, market power Lee and Ducruet (2009), Notteboom (2009b), Yang and Chen (2016)
• Stable structure port hierarchy Charlier (1988)	→ • Economies of scale and stable traffic concentration Starr (1994), Notteboom (2006b), Fremont and Soppe (2007)	→ • Stable hierarchical positions Cullinane and Wang (2012), Ducruet and Notteboom (2012b)
• Regional integration and hinterland penetration Hoare (1986), Airriess (1989)		→ • Regional integration, cross border integration, commercial diversification, expansion of foreland, overlapping hinterland Lee and Ducruet (2009), Lemarchand and Joly (2009), Laxe et al. (2012), Wilmsmeier and Monios (2013)
	• Technological innovation Kuby and Reid (1992), Wang (1998), Lee et al. (2008)	
	• Concentration of investment and export-led policy Todd (1993), Hoyle and Charlier (1995)	→ • Government support, regulations, political stability Ducruet et al. (2009b), Wang and Ducruet (2012), Wang and Ducruet (2013), Van Dyck (2015)
		• Increasing need for container transshipment and varying levels of productivity and efficiency McCalla (2008), Notteboom (2010), Wilmsmeier and Notteboom (2011), Notteboom et al. (2014), Van Dyck (2015), Suarez-Aleman et al. (2016)

Source: Wiradanti et al. (2017, p.10), modified and updated from Ducruet et al. (2009b)

Second, on economies of scale, stable structure and port hierarchy. In period-1, structural change is considered as a slow process (Charlier 1988). However, in the next period, decreased port of calls by shipping lines are more pronounced, which imposed more economies of scale and stable traffic concentration (Starr 1994; Notteboom 2005, 2006b; Fremont and Soppe 2007). Moreover in period-3, using Multiple Linkage Analysis confirms that ports having the most inflow and outflow shows their position in the top hierarchy such as Shanghai, Hong Kong, Singapore and Shenzhen (Cullinane and Wang 2012). A stable structure exist in the network (Ducruet and Notteboom 2012b). They are too big to be missed as a port of call.

Third, on regional integration and hinterland penetration. In period-1, the trend of regional integration with the spread of containerization technology in preexisting transport conditions resulted in concentration at particular ports (Hoare 1986; Airriess 1989). Some ports could not depend on particular origin regions as their hinterland and some ports successfully broadened their areas, as in the case of UK ports (Hoare 1986). Furthermore in period-3, globalisation brings more mixed hinterlands, which was mentioned as 'maritime range' by Lemarchand and Joly (2009). Same pattern occurs with cross border integration (e.g. case of Hong Kong), commercial diversification, expansion of foreland, overlapping hinterland (Lee and Ducruet 2009; Wilmsmeier and Monios 2013). During crisis, commercial diversification and expansion of foreland is to offset fall in demand (Laxe et al. 2012).

New factors occurring in Period-2 are: a) technological innovations; b) concentration of investments and export lead policy. **First, on technological innovation**. Concentration occurs in ports that are technologically more advanced. In contrast to Hayuth's deconcentration in the 1980s United States port system, Kuby and Reid (1992) argues that these advances includes containerization, larger ships and trains, also information technology for freight tracking and billing. This is also reflected in Hong Kong compared to Chinese ports which were not well developed yet, reflecting different levels of economic development (Wang 1998). Moreover, other advances takes place in planning, creating Asian global hub port cities which combines port and urban development in 'consolidation' to increase productivity (Lee et al. 2008). Technology is no longer discussed in the next period because the following years stresses more on different level of implementation of these technologies.

Second, on concentration of investment and export-led policy. Concentration of investment is actually another form of technological innovation which applies to developing economies that have less access to technology. An example is the implementation of steamship and railway

technology to establish colonial control in the East African case by Hoyle and Charlier (1995). Investment could also be formed as trade enhancement such as Taiwan's case, where their port system was developed in parallel with industrialization and export-led policy (Todd 1993). In the next period, it was further on showed the support of foreign investment and modernization (Ducruet et al. 2009b), support of government by regulations and the importance of political stability which influence to concentration of investment (Wang and Ducruet 2012, 2013; Van Dyck 2015).

Meanwhile, new factors occurring in Period-3 are related to the increasing need for container transshipment and varying levels of productivity and efficiency (McCalla 2008; Notteboom 2010; Wilmsmeier and Notteboom 2011; Notteboom et al. 2014; Van Dyck 2015; Suarez-Aleman et al. 2016). There are different levels of port productivity and efficiency, especially in developing economies, as a result of private sector participation, corruption in public sector and improvements in intermodal facilities (Suarez-Aleman et al. 2016). Shipping lines avoid unreliable ports and use hub ports as buffer zones to protect them from negative impacts of inefficiency (Wilmsmeier and Notteboom 2011). It is actually unclear whether increasing need for transshipment resulted in concentration or deconcentration. However, the literature suggests that concentration still occurs despite deconcentration trends.

Deconcentration Factors

Literature theme on deconcentration factors mainly explains 'peripheral port challenge' and why there are deconcentration of cargo from existing hub ports. Ducruet et al. (2009b) interprets deconcentration as the consequence of new port development, carrier selection, global operation strategies, governmental policies, congestion, and lack of space at load centres. The following Table 2.27 are deconcentration factors compiled by time period.

There are two deconcentration factors in period-1 that continues to be discussed forward in the next periods, which are: a) hinterland-foreland changes; b) congestion, lack of space and diseconomies of scale. **First, on hinterland-foreland changes**. Deconcentration in ports occurs because of the origin of the cargo itself changes. In period-1, these changes stressed more on the new infrastructure developed in the hinterland such as in St. Lawrence Seaway and railways in the United States (Kenyon 1970), also traffic specialization (Charlier 1988).

Table 2.27 Deconcentration Factors in Literature Since 1970

Period-1: 1970-1990	Period-2: 1990-2008	Period-3: After 2008
• Hinterland-foreland changes and traffic specialisation → Kenyon (1970), Charlier (1988)		• Hinterland-foreland changes, emerging regions, traffic specialization, direct connections, Notteboom (2010), Feng and Notteboom (2013), Xu et al. (2015), Yang et al. (2016)
• Congestion, lack of space for development, diseconomies of scale → Ogundana (1971), Hayuth (1981, 1982), Barke (1986)	• Congestion and diseconomies of scale Notteboom (1997), Wang (1998), Lee et al. (2008)	
	• New port development, modal shift, strategy of transnational operators → Hoyle (1999), Slack and Wang (2002), Notteboom and Rodrigue (2005), Notteboom (2006a)	• Increasing need for container transshipment, rise of secondary port, strategies of transnational operator, institutional adaptations McCalla (2008), Notteboom (2009b), Wang and Ng (2011), Wilmsmeier and Notteboom (2011), Monios and Wilmsmeier (2012), Wilmsmeier and Monios (2013), Wilmsmeier et al. (2014)
	• Port selection and shipping line concentration → Charlier (1998), Wang and Slack (2000), Notteboom (2005), Fremont and Soppe (2007)	• Port selection, flexibility and accessibility Notteboom (2009b), Notteboom (2010), Ducruet and Zaidi (2012)
	• Port competition and urban growth → De and Park (2003), Ducruet and Lee (2006)	• Port competition, changing port hierarchy Ducruet et al. (2009b), Lee and Kim (2009), Wang et al. (2012), Wang and Cullinane (2014), Fraser et al. (2016), Pham et al. (2016)
	• National/government and regional development plans → Brunt (2000), Ducruet (2008)	• Government plans and policy, Port Devolution Ducruet et al. (2009b), Lemarchand and Joly (2009), Shinohara (2009), Parola et al. (2013), Wilmsmeier and Monios (2016)

Source: Wiradanti et al. (2017, p.11), modified and updated from Ducruet et al. (2009b)

In the next period, hinterland-foreland changes pays more attention on emerging trade regions and direct connections (Notteboom 2010; Feng and Notteboom 2013; Xu et al. 2015; Yang et al. 2016).

Second, are congestion, lack of space and diseconomies of scale. Initial concept of peripheral port challenge in the first place is congestion in large load centres and lack of space for expansion (Hayuth 1981, 1982; Barke 1986). Further on, discussed in period-2 that there is a shift to medium-sized ports (Notteboom 1997) or from congested road to river transport in China (Wang 1998). Hong Kong and Singapore successfully overcome these problems in the late 1980s and remained as prominent hub port cities, by adapting a port–urban city growth, improving port productivity and efficiency, and urban attractiveness (Lee et al. 2008). However, later on congestion is not discussed since deconcentration to new locations are perceived to be the strategies of transnational port operators.

Deconcentration factors which emerges in period-2 are related to: a) new port development; b) port selection; c) port competition, new technologies and urban growth; d) national/government and regional development plans. **First, on new port development**. It is meant new developments not located in existing dominant city-port, but in a new urban and industrial growth pole (Hoyle 1999), seeking more business opportunities and port regionalization as the strategies of transnational operators (Slack and Wang 2002; Notteboom and Rodrigue 2005; Notteboom 2006a). It intensifies in the next period by increasing need for container transshipment, rise of secondary ports, strategies of transnational operator and institutional adaptations (McCalla 2008; Notteboom 2009b; Wang and Ng 2011; Wilmsmeier and Notteboom 2011; Monios and Wilmsmeier 2012; Wilmsmeier and Monios 2013; Wilmsmeier et al. 2014).

Second, on port selection and shipping line concentration. This factor is from shipping line's point of view having to choose which port becomes their dedicated hub to secure port service, reduce cost or gain efficiency in operations (Charlier 1998; Wang and Slack 2000; Fremont and Soppe 2007). Another example are transshipment hubs formed in the Mediterranean due to low diversion distances (Notteboom 2005). The same logic continues in the next period for shipping lines to get more flexibility and accessibility to market (Notteboom 2009b; Notteboom 2010; Ducruet and Zaidi 2012). **Third, on port competition and urban growth**. This factor underlines the outcome of the two previous factors. Having new ports and port selection challenges in the region causes port competition. The competition also intensifies

among the long-standing hub ports with increasing urban population (De and Park 2003; Ducruet and Lee 2006). Furthermore in the next period, port competition is discussed related to changing shipping routes and likelihood for a changing port hierarchy (Ducruet et al. 2009a; Lee and Kim 2009; Wang et al. 2012; Wang and Cullinane 2014; Fraser et al. 2016; Pham et al. 2016).

Fourth, on national/government and regional development plans. Besides transnational port operators' strategies, national governments also have a say in these deconcentration. Government has agenda to look after their peripheral regions and reduce dependency on existing hubs (Todd 1993; Brunt 2000; Ducruet 2008; Lemarchand and Joly 2009). In the next period, these are expressed in government policies, port reforms or devolution (Ducruet et al. 2009b; Shinohara 2009; Parola et al. 2013; Wilmsmeier and Monios 2016).

Port Performance and Competitiveness Factors

These factors in the literature explains performance, competitiveness and other aspects of the port which makes it worth to become a hub. It represents the port's own perspective. The literature shows that besides accepting its fate, whether they are chosen or not to become port of call, ports are becoming more active to capture growth. Literature on port performance and competitiveness factors are compiled in Appendix 3 Table 1.

Hub Location Factors

Hub location factors explains reasons why hub ports should be developed in a particular location and the attractriveness of the location. It represents the shipping lines and cargo owners' perspective, also academicians perspective on what a hub location should be. Various research on hub location problems aims to design a hub network, with decisions to be made includes location decision and how to route the traffic or the flow from origins to destinations (O'Kelly 1998; Bryan and O'Kelly 1999). Literature on hub location factors are compiled in Appendix 3 Table 2.

Port Selection Factors

Factors which explains why shipping lines and other stakeholders select a particular port to be their port of call. It represents the liner shipping, shipper/cargo owner, and freight forwarders' perspective. Shipping lines prefer transhipment to achieve economies of scale and reduce cost while shippers prefer direct services to enable shorter transit time, as described in Table 2.17 in Section 2.2.3. Shipping line's attempt to achieve economies of scale leads to overcapacity of supply, hence more competition and force them to have collaboratiton/mergers and

differentiation UNCTAD (2015). Port selection is inevitable. They have a terminology 'Tailcutting' means ports with lowest volumes are not included anymore as a port of call Gouvernal et al. (2011). Literature on port selection factors are compiled in Appendix 3 Table 3.

Willingness to Invest in Peripheral Ports and Peripheral Locatioons

The willingness research, specifically willingness-to-pay concept from economics, is concerned about a certain point in which consumer's behaviour could change (see Section 2.3.2). However, this is not conducted in the Thesis. The concept of willingness is adopted for the Thesis in order to understand and measure stakeholders' behaviour towards peripherality and peripheral ports.

To measure willingness, item questions by Guy and Urli (2006) is adopted since it is considered as the most relevant study with the research context in this Thesis. As explained before in Section 2.3 on the concept of willingness, their study aims to measure the preference of shipping lines to make port of call in New York and Montreal, a main hub and a peripheral port. The unique feature of their items is that it represents scenarios for respondents. These scenarios enable to stimulate respondents to express their preference in a contrasted situation between service and cost. Hence, their seven item questions represent seven evaluation scenarios as described in Table 2.28.

Table 2.28 Item Variables for Willingness

Item Variables for Willingness	Location of Study
1) Neither cost nor service advantage for either of the ports;	New York and Montreal
2) A twofold transit cost advantage for Montreal;	
3) A twofold port service advantage for Montreal;	
4) A twofold transit cost advantage with a twofold port service advantage for Montreal;	
5) A twofold transit cost advantage for New York;	
6) A twofold port service advantage for New York;	
7) A twofold transit cost advantage with a twofold port service advantage for New York.	

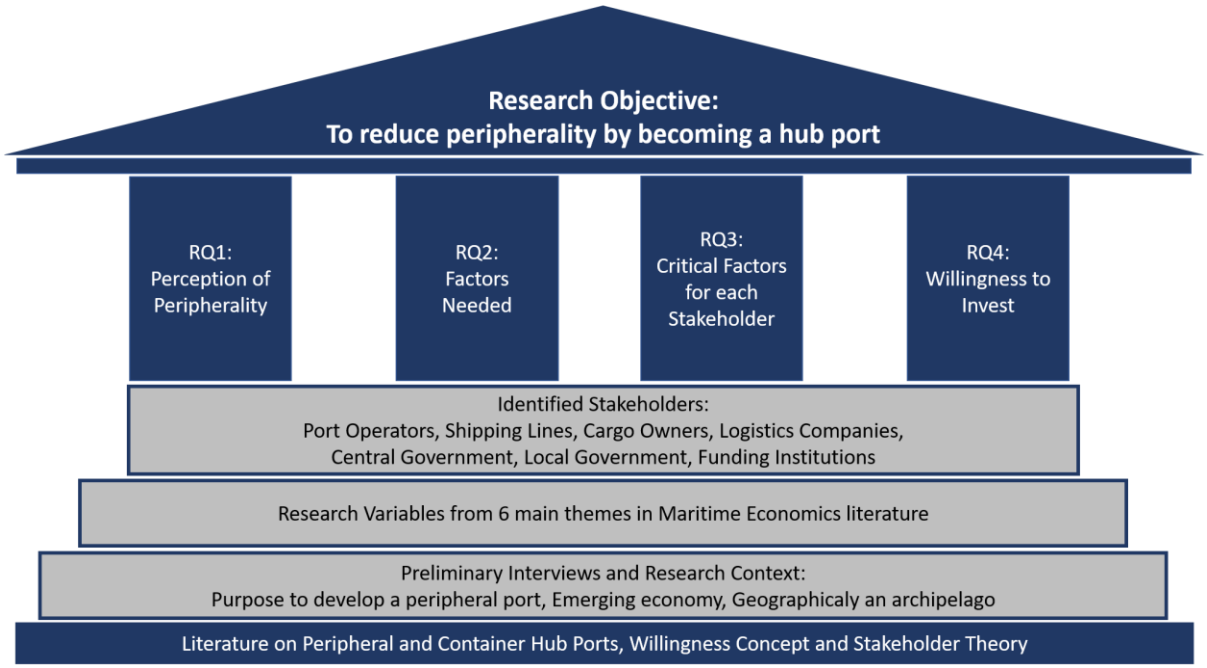
Source: Guy and Urli (2006)

2.5 Conceptual Framework and Conclusion

The literature review provides the foundation of what has been done by researchers so far and helps to identify what needs to be done, especially on peripheral ports and container hub ports as the main topic of this Thesis. This is then translated into four main research questions. The literature review on peripheral ports (Section 2.1), container hub ports (Section 2.2), stakeholders in maritime transport and willingness to invest (Section 2.3) shows that there are gaps in the literature. These gaps become foundation for the research question of the Thesis,

which consists of perception of peripherality, factors needed to develop a hub in a peripheral location, critical factors for each stakeholder and willingness to invest.

Moreover, the research context on Indonesia (Section 1.5), global trade and emerging economies (Appendix 1), stakeholders in Indonesia's maritime transport and literature categorisation (Section 2.4) adds the literature into a conceptual framework, as seen in Figure 2.17. A Pillar Diagram is used to represent the conceptual framework. A pillar diagram is chosen because conceptually the four research questions investigate how to reach the research objective. However, these research questions do not have a causal-effect relationship with each other. In the next chapter, these research questions are aligned with the appropriate methodology and investigated further by empirical data and analysis.



Source: Author

Figure 2.17 Research Framework in a Pillar Diagram

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Chapter 3
Research Methodology

"If you understand how the universe operates, you control it, in a way"
(Stephen Hawkings – British Physicist).

The previous two Chapters has provided basic knowledge and state of the art about the topic of this Thesis. In this chapter, the rationale of every decision on research approach and methods is explained. This includes justifications in research methodology (Section 3.1), qualitative phase research process (Section 3.2), and quantitative phase research process (Section 3.3).

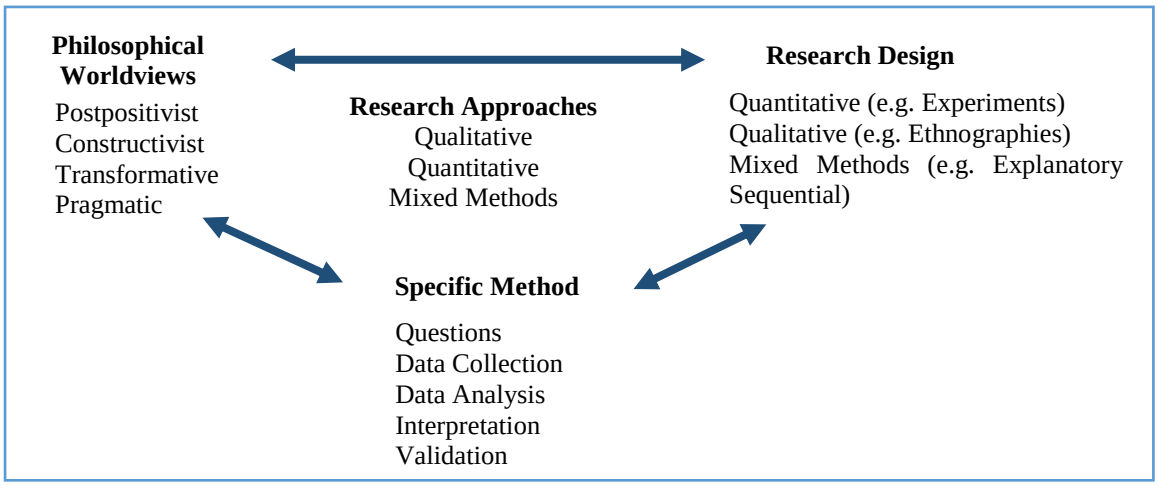
3.1 Justifications in Research Methodology

Conducting research is a systematic way of 'finding out' or investigating about a specific issue or a problem, as stated by Sekaran (2003), it involves *"well-thought-out and carefully executed activities".* According to its main purpose, there are two types of research which are applied research and basic/pure research: the former to solve a current problem and take corrective action, while the latter is to enhance understanding of the problem then generate or contribute to the body of knowledge (Sekaran 2003).

Moreover, this research is in the social sciences which deals with human beings and *"the real world"*. According to Gray (2014), the real world comprise of organisations or business or institutions that are important sites for research, communities or networks where people communicate, have relationships and discourse. Unlike natural science research, there is no single method in doing social research because social research differs by having the ability to ask questions of those studied, also influence by political and/or value considerations (May 2001, p.8).

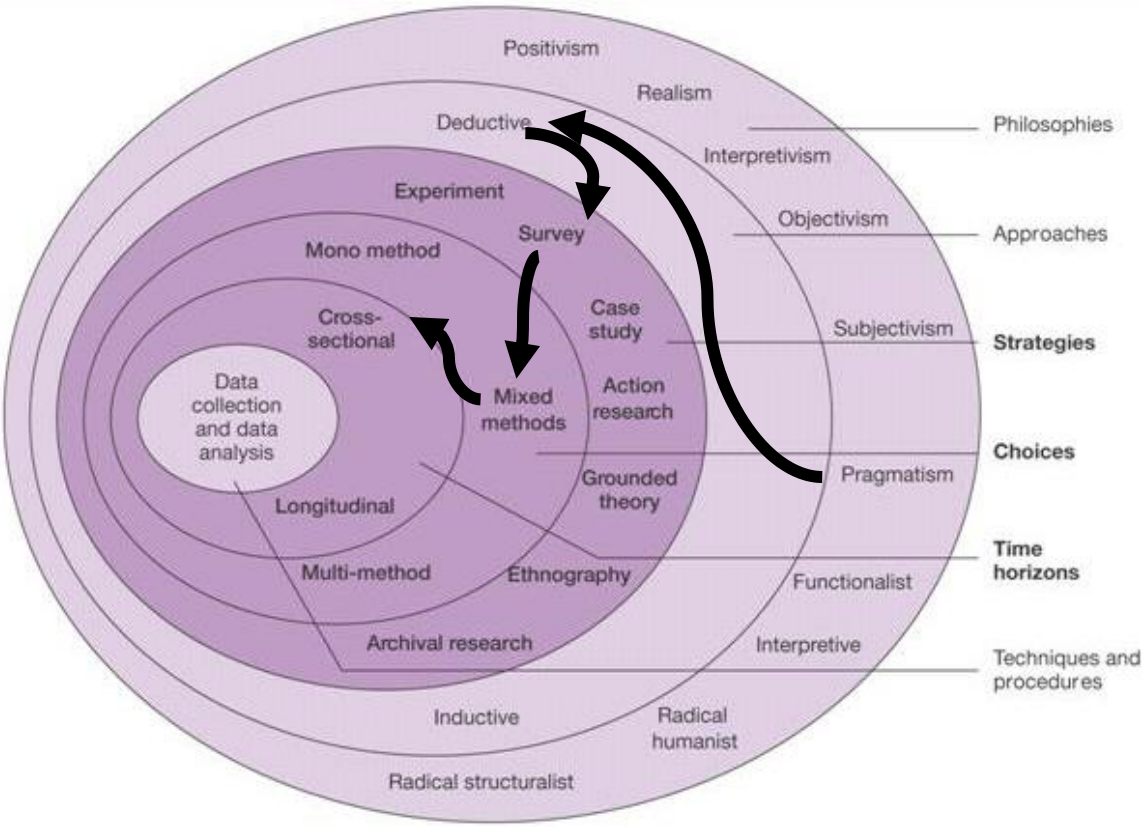
Having different approaches or strategies in social science research means that the researcher has to make decisions, depending on the research questions they are trying to answer. Therefore, justifications for choosing the appropriate method is critical. According to Cresswell (2014), research approaches are the plan and procedure to all the decision making done throughout the research, which includes three components: philosophy, research design and specific method, as described in Figure 3.1. Meanwhile, Saunders et al. (2007, 2009) provides

the ‘research onion model’ to guide researchers in deciding each parts of their methodology, as seen in Figure 3.2, which is useful even though practically a particular research question might not fall neatly into the each part of the onion. This leads to the overall method for the Thesis as depicted in the research flow diagram (Figure 1.5 in Chapter 1).



Source: Cresswell (2014, p.5)

Figure 3.1 The Interconnection of Worldviews, Design and Research Methods as a Framework for Research



Source: Saunders et al. (2007, p.102)

Figure 3.2 Position of this Thesis in The Research Onion by Saunders et al (2007)

Based on Figures 3.1 and 3.2, the methodological position of this thesis lies as follows.

- Philosophy / Philosophical Worldview: Pragmatism (not Positivism and not Interpretivism),
- Approach: Deductive-inductive,
- Strategies: Single case study,
- Choices / Research Design: Mixed Methods with exploratory sequential,
- Time Horizons: Cross Sectional,
- Data collection method: Interviews (qualitative) and Online Survey (quantitative),
- Data analysis method: qualitative data analysis and Exploratory Factor Analysis (quantitative).

3.1.1 Worldview and Philosophical Position: Pragmatism

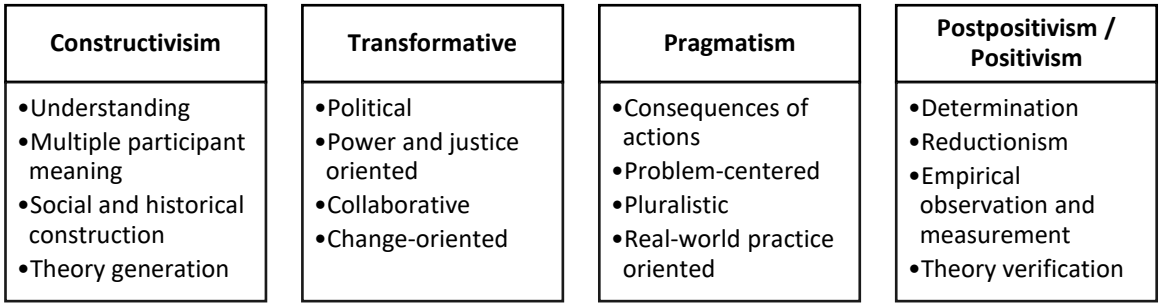
Types of Worldview/Philosophical Position

Every research approach is shaped by a worldview or philosophical position. Worldview of research arise from the field or discipline itself, previous research experience and advisor's inclinations (Cresswell 2014). Choosing a philosophical position is choosing our way of viewing the relationship between knowledge and the process to achieve them (Saunders et al. 2007). It could also be seen as a paradigm, which is the worldview with associated assumptions attached to it (Teddlie and Tashakkori 2009). Furthermore, an epistemological position in the philosophy of research determines what are acceptable knowledge in a discipline, hence an important question to identify an epistemological position is whether the social world in that particular discipline is studied the same way, using same principles and procedures as natural sciences (Bryman and Bell 2003, p.13).

There are various types of worldviews, philosophical or epistemological position since different authors emphasise on different things in the historical development of social and behavioural science research. The main two views that are generally discussed as two extremes of a line continuum are positivism and interpretivism/constructivism (Guba and Lincoln 1994; Bryman and Bell 2003; Johnson and Onwuegbuzie 2004). Cresswell (2014, pp.4-12) added two more views from the previous extreme worldviews, which are transformative and pragmatism, each having different features as described in Figure 3.3.

First, Constructivism / Interpretivism is concerned with human action by understanding their empathic or expressions (Bryman and Bell 2003). The 'knower' and 'known' are not

independent, hence, they interact; there are values attached (subjectivity); also the reality is constructed, multiple and holistic (Lincoln and Guba 1985 in Teddlie and Tashakkori 2009, p.86). In order to capture 'meaning', researcher needs to have personal involvement and reality can be interpreted as social action (Robson 2002). Other sources also mention this view as 'naturalists' or 'phenomenology'. Johnson and Onwuegbuzie (2004) mentioned researchers in this position as 'Qualitative Purists'.



Source: Cresswell (2014, p.6)

Figure 3.3 The Four Worldviews

Second, is the Transformative worldview, which emerged in 1980s (e.g. Marx, Adorno, Marcuse, etc.) as a response to limitations of postpositivism to support marginalised individuals or groups in research (Cresswell 2014, pp.9-10). It is concerned with specific issues such as power, social justice, inequality, discrimination or oppression, hence, the research purpose should be intertwined with political agenda to improve the social injustice (Mertens 2010 cited in Cresswell 2014, pp.9-10). This philosophy is then strengthened by having research methods which enables the marginalised entity to participate in the research process, such as participating in designing questions, data collection or analysis. Researchers must collaborate with participants or research subjects in order to improve their marginalised position (Teddlie and Tashakkori 2009; Cresswell 2014).

Third, is the Pragmatists worldview or pragmatism. It was pioneered by American philosophers Charles Pierce, William James and John Dewey, which actually came before the transformative worldview in the early 20th century (Gray 2014). Other famous writers known later in the late 20th century are J.P. Murphy, M.Q. Patton and R.Rorty (Cresswell 2014). It is a philosophical view which stresses on practicality or utility for the research and research methods, to suit a purpose, bring solution to problems and improving society (Feilzer 2010; Cresswell 2014; Gray 2014). The truth is what works at the particular time, not seeing reality as independent or dependent of the mind (Cresswell 2014). Rorty (1999 cited in Feilzer 2010) argued that

pragmatists are ‘anti-dualists’, which means they are questioning positivism and constructivism, and as a result implies quantitative and qualitative methods to converge.

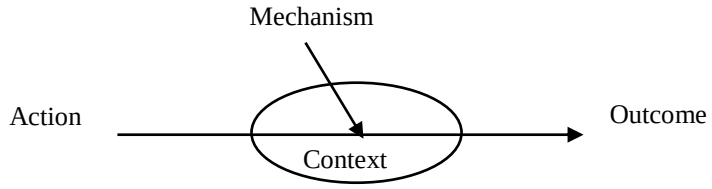
Lastly, the fourth worldview in Figure 3.3 is Positivism. It is an epistemological position where social world is studied using principles, procedures, and methods that are applied in natural science, with the following principles (Bryman and Bell 2003, pp.13-15): phenomena must be confirmed by senses to become knowledge; includes deductive approach to test theories and/or develop laws; conducted without the value of the researcher or objectively. Research is predominantly to identify and understand the cause and effect relationships or reduce complexity into manageable variables and data sets, or to test a hypotheses (Cresswell 2014). Johnson and Onwuegbuzie (2004) mentioned researchers in this position as ‘Quantitative Purists’.

However, positivist are criticised because there are differences between physical and social worlds, and that human beings have ‘autonomous reflection’ compared to objects, hence it could lead to failure and unable to produce ‘laws’ (Williams and May 1996, p.48). Researchers lose ‘rich insights’ by reducing the complexity of the social world of business and management to ‘law-like generalisations’ (Saunders *et al*., p.106). Respondents to the research as producers of data are not scientific objects, instead they are partners or experts valuable for the research (Sarantakos 1998 cited in Robson 2002).

Further on, positivism develops into other varities such as postpositivism and realism / critical realism. Postpositivism emerged to address criticism on positivisim, which still holds on to emphasizing quantitative methods and objective value system (Teddlie and Tashakkori 2009). Critical realism is an antipositivist movement in the social sciences closely associated with the works of Roy Bhaskar (i.e. in 1978, 1982, 1990) and Rom Harre (i.e. in 1981, 1986) (Robson 2002; Denzin and Lincoln 2008). Similar to positivists, they agree that the world events are observable and independent of human consciousness, however, the reality has different levels, mechanisms, processes and structures which allows different patterns to happen (Denzin and Lincoln 2008, p.17). The reality exists independently of the researchers’ awareness of it, with the following Figure 3.4 showing a simple interaction between action, mechanism (more than one is possible) and context influencing a unique outcome (Robson 2002, pp.33-36).

Determining epistemology, ontology and axiology of the research is not as important as determining the research question itself (Saunders et al. 2009). Results of pragmatist research is non-judgemental and open to uncertainty because it believes that produced knowledge is not

absolute (Teddlie and Tashakkori 2009, p.93). Pragmatism supports both top-down deductive and grounded inductive research designs (Feilzer 2010). William James' famous quote is *'The truth is what works'* (Gray 2014, p.43).



Source: Robson (2002, p.33)

Figure 3.4 Mechanism in Critical Realism

Philosophical Position in the Research Domain of the Thesis

This thesis lies in the field of Port Economics and Maritime Transport (as explained in Chapter 1.4). In a wider perspective, the position relates with Logistics and Transport research. This section discusses the worldview/philosophical position, or in other words, the 'traditions' in Logistics and Transport research in order to determine the appropriate position for this Thesis.

Positivism is the prevalent philosophical position of research in Logistics and Supply Chain Management, with quantitative methodologies, and future research is argued to be be more focused on theory development (Mentzer and Kahn 1995; Mangan et al. 2004; Burgess et al. 2006). This positivist tradition in logistics and management research is not only to be accepted in the field, but also to be published in the field (Naslund 2002). There is a rising trend of more qualitative studies and studies in between positivism-interpretivism paradigm (Mangan et al. 2004).

Gammelgaard (2004) tried to identify further this positivism dominance by using Arbnor and Bjerke's methodological framework (1997) to divide logistics research into 3 main schools, as seen in Table 3.1. Their work is based on analysing research paradigms in three well known logistics journal articles between 1998 to 2003. The first school is analytical approach which is based on positivism, second is systems school which is based on systems theory and the third is actors school based on sociological meta-theories (Gammelgaard 2004). The purpose of analytical approach type of research is to gain general knowledge which is time and value free. A systems approach is to develop maps and models for logistics, which has 'complex' causal-effect in nature. Lastly, an actors approach is to understand behaviour and interactions between people and/or organisations across the supply chain.

Port researchers have not explicitly discussed about research paradigm. The most relevant study is a structured literature review of Seaport Research from 1980 to 2009 by Woo *et al.*

(2011) which identified that most port research articles have a 'functionalism paradigm', considered as positivism. The numbers are shown in Table 3.2. In more detail, perspectives in looking at Seaport problems involves various disciplines. The three most dominating disciplines are Economics, Geography and Operation Research, then followed by industrial relations, strategic management, and logistics/supply chain management (Woo et al. 2011). There is also an increasing trend of more interpretivist 'people perception' studies since human factors are involved, hence more surveys and interviews are required to capture behavior and perception in port research (Woo et al. 2011).

Table 3.1 Three Schools in Logistics Research by Gammelgaard (2004)

	Analytical approach	**Systems approach**	**Actors Approach**
Theory type	Determining cause effect relations, explanations, predictions, universal time and value free laws.	Models, recommendations, normative aspects, knowledge about concrete systems.	Interpretations, understanding, contextual knowledge.
Preferred method	Quantitative, with qualitative research only intended as validation.	Case studies, qualitative and quantitative.	Qualitative.
Unit of analysis	Concepts and their relations.	Systems: links, feedback mechanisms and boundaries.	People and their interaction.
Data analysis	Description, hypothesis testing.	Mapping, modelling.	Interpretation.
Position of the researcher	Outside.	Preferably outside.	Inside, as part of the process.

Source: Arbnor and Bjerke's (1997) in Gammelgaard (2004, p.482)

Table 3.2 Research Paradigms in Port Research Articles by Woo et al (2011)

Paradigm	**1980s**	**1990s**	**2000s**	**Total**
Functionalist (Positivist)	112	208	510	830
Interpretivist	2	2	2	6
Radical Humanist	-	-	-	-
Radical Structuralist	-	3	1	4
Total	114	213	513	840

Source: Woo et al. (2011, p.669)

Philosophical Position of the Thesis: Pragmatism

The previous sections have described the types of worldview in social science and identified where logistics and port research lie. This section is to determine the worldview for this thesis and its rationale. Pragmatism is considered as the the author's worldview/paradigm because the author is influenced by the field/discipline and previous research experience, as previously explained by Cresswell (2014). These two main reasons are detailed as follows.

First, is the influence of Maritime Economics and Transport Geography field. Literature review in Chapter 2 has shown that issues in the field requires subjectivity or listening to 'the voice' of relevant stakeholders, to understand their perception, needs and willingness. However, on the other hand it also requires objectivity in measuring cargo throughput, measuring people's behaviour, attitude or mental judgement. Hence, the field is explisitly influenced by Pragmatism worldview, which is in between the two worldview extremes positivism and interpretivism. This also influence the author, to be able to fit with the tradition of the domain field where she is investigating. The author could also contribute value to the field in the same tradition, using pragmatists paradigm.

Second, is the influence of the researcher's previous experience. The Author has an educational background in Industrial Enginering and work experience in strategic planning of a port operating company. Hence, the author is explisitly used to solving real-world problems. As previously explained, Pragmatist worldview fits to create action promoting equity and solve problem in the real world (Rorty 1998 in Gray 2014). Specifically, this thesis is concerned with the small-peripheral ports which has less power / support by the government and unattractive for the maritime transport business sector. The author does not position herself in a transformative worldview because she views herself as an independent researcher. If the author uses a transformative view, marginalised respondents (small-peripheral ports) can interfere in the research design, process and results of the study. The author does not want interference from any other party and keep the research neutral. She tries to balance the point of view, not only looking at perception of the small-peripheral ports but also other related stakeholders such as government and private sector involved. Results of Thesis study is still focused to contribute to literature/ body of knowledge, not mainly to promote equality and justice. It would be a bonus if the results of this study could help promote Eastern Indonesia's peripheral ports.

Furthermore, pragmatism position fits methodologically with Mixed Methods. Teddlie and Tashakkori (2009, p.88) explains distinctions between four major paradigms and how these paradigms relate with research methodology (see Table 3.4). Regarding methods and logic (point 1 and 2 in Table 3.4), pragmatism enables the use of either methods or both (qualitative and quantitative) based on the research questions and ongoing phase of the research cycle (inductive and deductive) (Teddlie and Tashakkori 2009). In this Thesis, the Author starts with developing research framework or gathering research variables – in Chapter 3 then try to test it in the case of Eastern Indonesian ports, which is a deductive process. Then qualitative data by interviews is collected to revise the initial research framework, which is an inductive

process. Finally, it is tested again by survey to identify the critical factors to create port deconcentration and reduce peripherality in Eastern Indonesia's ports, which is again deductive process. Hence, the deductive – inductive – deductive process suits with pragmatists paradigm. Besides deductive and inductive, there is another approach still rarely used in logistics research which is abductive research. In abductive approach, the research follows a logical sequence from rule, to case then to result, in which the case here represents a probable but not logically necessary conclusion (Kovács and Spens 2005). However, an abductive approach is not used in this Thesis because similar to purely inductive research, it both starts with empirical observation before any theoretical framework is adopted (Kovács and Spens 2005).

Regarding epistemology-axiology-ontology in Pragmatism (point 3, 4 and 5 in Table. 3.4), this Thesis deals with both subjective and objective point of view, having values important to interpret results and considers various view point on social realities. Regarding causal linkages and generalisation (point 6 and 7 in Table. 3.4), this Thesis tries to reduce large number of variables because looking for causal relations is too difficult (for future research) and ideographic statements (time-context bounded) is emphasised. Table 3.3 details how the author's pragmatism worldview implies to the Thesis' research questions and methodology.

Table 3.3 Implications of Pragmatism Worldview for this Thesis

Research Questions	Keyword	Characteristics	Implication on Method
RQ1: What is peripherality in the context of maritime economics?	Perception	Pragmatism with a tendency to Interpretivism (understanding meaning), improve society	Qualitative Methods
RQ2: What are the underlying concentration-deconcentration factors for developing a successful hub port in a peripheral location?	Factors Needed	Pragmatism, "What works", to bring solution, practicality	Mixed Methods
RQ3: What are the critical factors for each stakeholder?	Critical Factors	Pragmatism, "What works", to bring solution, practicality	Mixed Methods
RQ4: What are the stakeholders' willingness to invest in peripheral ports?	Willingness	Pragmatism, "What works", bring solution, improve society	Mixed Methods

Source: Author

3.1.2 Research Strategy: Survey

Research strategy is the 'logical sequence of activities' to arrive at the research conclusions from the research question (Yin 2009, p.26). According to the research onion by Saunders et al. (2007, p.102) in Figure 3.2., there are various types of research strategy : Experiment, survey, case study, action research, grounded theory, ethnography and archival research. Meanwhile, Yin (2009, p.8) categorised it into experiment, survey, archival research, historical research and case study as seen in Table 3.5.

Table 3.4 Distinctions among Five Major Paradigms

Dimensions of Contrast	*Interpretivism/Constructivism*	*Transformative*	*Pragmatism*	*Postpositivism / Positivism*
1- Methods	QUAL.	Both QUAL and QUAN; community of participants involved in methods decisions.	Both QUAL and QUAN; researchers answer questions using best methods.	Primarily QUAN.
2- Logic	Inductive.	Both inductive and hypothetico-deductive.	Both inductive and hypothetico-deductive.	Hypothetico-deductive.
3- Epistemology (researcher/ participant relationship)	Subjective point of view; reality co-constructed with participants.	Both objectivity and interaction with participants valued by researchers.	Both objective and subjective points of view, depending on stage of research cycle.	Modified dualism, and pure dualism for positivism.
4- Axiology (role of values)	Value-bound inquiry.	All aspects of research guided by social injustice.	Values important in interpreting results.	Values in inquiry, but their influence may be controlled. Value-free inquiry for Positivism.
5- Ontology (the nature of reality)	Ontological relativism-multiple, constructed realities.	Diverse viewpoints regarding social realities; explanations that promote justice.	Diverse viewpoints regarding social realities; best explanations within personal value systems.	Critical realism (external reality that is understood imperfectly and probabilistically). Naïve realism (an objective, external reality that can be comprehended) for Positivism.
6- Possibility of causal linkages	Impossible to distinguish causes from effects; credibility of descriptions important.	Causal relations that should be understood within the framework of social justice.	Causal relations, but they are transitory and hard to identify; both internal validity and credibility important.	Causes identifiable in a probabilistic sense that changes over time; internal validity important.
7- Possibility of generalisation	Only ideographic statements possible; transferability issues important.	Ideographic statements emphasised; results linked to issues of social inequality and justice.	Ideographic statements emphasised; both external validity and transferability issues important.	Modified nomothetic position; external validity important.

Source: Teddlie and Tashakkori (2009, p.88)

Table 3.5 Types of Research Strategy by Yin (2009)

Method	Form of Research Question	Requires Control of Behavioral Events	Focuses on Contemporary Events
Experiment	How, why	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Archival Analysis	Who, what, where, how many, how much	No	Yes/No
History	How, why	No	No
Case Study	How, why	No	Yes

Source: Yin (2009, p.8)

This thesis uses survey as strategy because the nature of its research questions and research aims are dominantly to understand '*what'*, '*who'* and '*how much'* on the phenomena: *what* is peripherality; *who* are the main stakeholders; *what* are the underlying factors needed for a peripheral port to become a hub; *how much* importance is their perception on peripheral ports, *what* is their willingness; *how much* is their willingness.

According to Cresswell (2014, p.155), a survey design provides a quantitative / numeric description of trends, attitudes, or opinions of a population by using a sample of that population'. It is usually associated with a deductive approach (Saunders et al. 2007). However, survey as a research strategy can employ a range of methods in order to answer the research questions (Kelley et al. 2003). It can collect both quantitative and qualitative data since the most popular methods employed in survey strategy are postal questionnaire and face-to-face interview (Kelley et al. 2003). The advantage of survey strategy are as follows (Bryman and Bell 2003; Kelley et al. 2003; Saunders et al. 2007): its ability to produces data based on real-world observation; to reach a breadth of coverage based on representative sample; to be generalised to a population and produce a large amount of data in a short time for a fairly low cost. However, the disadvantage is its difficulty to control a high response rate (Kelley et al. 2003).

Research Strategy in the Research Domain of the Thesis

Each disciplines or field of studies uses certain methods or 'traditions' because they have certain theoretical interests, assumptions, perspectives and agendas or goals to achieve (Morse 2017). In logistics and transport field, Dunn et al. (1994) categorised three distinct areas and their traditional methods used in each areas. These three are : 1) generalized descriptions of variables -with case studies; 2) interpretation of informant perceptions -with surveys, interviews, expert panels; and 3) artificial reconstruction of reality -with model building (Dunn et al. 1994). Dominantly logistics research do not involve measurement of latent variables (Dunn et al. 1994).

Meanwhile, Mentzer and Kahn (1995) explored articles published in the Journal of Business Logistics (JBL) from 1978 to 1993. They found that logistics field are dominantly using survey (54.3%), followed by simulation (14.9%) and interview (13.8%) (Mentzer and Kahn 1995, p.242). They argued that logistics literature lack research on theory development, testing and application, which could support the maturity of logistics discipline (Mentzer and Kahn 1995). This is then supported by Sachan and Datta (2005) and Naslund (2002) that surveys are mostly used. Naslund (2002) challenged that researchers in logistics to be more open to non-traditional forms, to use more qualitative methods, action research and case studies in order to develop and advance logistics research.

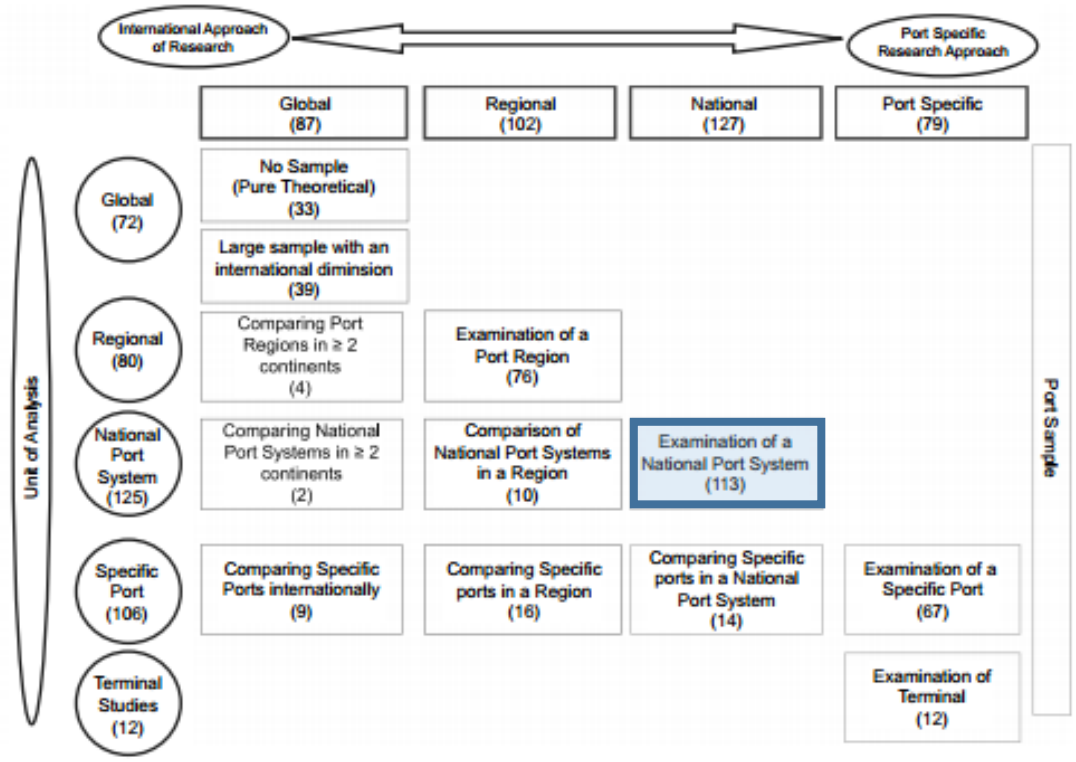
In port research, methods used are dominantly in-depth case studies (Pallis et al. 2010; Woo et al. 2011). Woo et al. (2011, p.670) explored articles published in prominent journals in port, transport and maritime economics field from 1980 to 2009 and found that research strategy mostly used are: analytical conceptual (41.2%), empirical case studies (21.4%), empirical statistical (20.5%), analytical mathematical (16.4%). There is an increasing trend in 2000s to use research data from surveys and interviews (Woo et al. 2011). Case studies are mostly used because port research's scope are 'relatively local', where dominantly it studies specific ports located in the author's country or region (Pallis et al. 2010, p.120). Meanwhile in a more specific field in maritime economics, Vieira et al. (2014) explored articles published related to port governance from 1992 to 2013 and found that research strategy mostly used are qualitative approach based on case studies and conceptual works. Port governance studies is mentioned as an 'incipient' field (Vieira et al. 2014).

In this thesis, survey is also considered appropriate because it is widely used, besides case studies, in the research domain of the thesis. Survey as a research strategy, either using quantitative and qualitative approach, is one of the traditions in logistics and transport studies, also an emerging trend in maritime economics literature.

Unit of Analysis: Indonesia's Maritime Transport System

Unit of analysis used in this Thesis is Indonesia's maritime transport system. The rationale is because the research questions implies to investigate perception, behaviour and willingness in the Indonesian maritime transport. This includes investigating at individual level and stakeholder type level. Individual respondents or participants of the study could represent a certain institution or company. However, there are some institution or company which are represented by more than one person for triangulation and quality control.

This justification is also aligned with the tradition in maritime and port economics literature, where national port systems are the most frequent used unit of analysis (Pallis et al. 2010). Pallis et al. (2010) conducted a systematic review of journal articles in 1997 to 2008 and concluded that unit of analysis used range from global, regional, national and individual ports. Global unit of analysis represents the international port system, regional analysis represents areas (e.g. Caribbean, European), national analysis represents countries, and finally individual port analysis represents one port/terminal operator or port authority. They described their findings in Figure 3.5. This thesis aims to look at maritime and port sector in Indonesia, which comprise of various stakeholders. It does not examine a specific port, for example the Port of Sorong only in Eastern Indonesia, because peripheral ports are investigated in a national level. Hence, in both qualitative and quantitative phase of the Thesis, analysis is focused on individual level and stakeholder level within Indonesia's maritime transport system.



Source: Pallis et al. (2010); (*) numbers represent papers reviewed

Figure 3.5 Unit of Analysis in Maritime and Port Economics Literature

3.1.3 Mixed Methods: Sequential Qualitative-Quantitative

Mixed Methods as Research Design

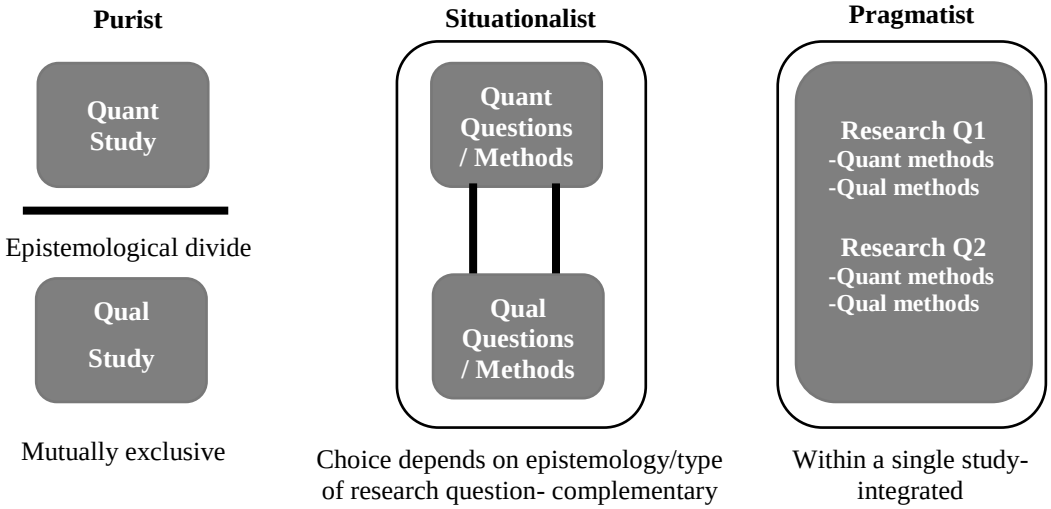
Research design and methods are tools, hence, the choice in research design determines which part of the data and information is significant and must be prioritised, also which is less significant and to be ignored (Morse 2017). In real world research, there are two types of research

design, which are fixed and flexible design (Robson 2002). In fixed design, researchers must know what they are looking for before conducting data collection, while in flexible design they begin from general and 'free-range exploring' (Robson 2002). A flexible or 'loose' designs are better for exploring unfamiliar phenomena or complex processes (Miles et al. 2014, p.19), and an inductive approach is used to 'build theory grounded from data' (Saunders et al. 2007, p.487). In this Thesis, a balance between flexible as well as a fixed design is needed because exploring peripheral ports also means to adopt strategies of large hub ports. Flexibility is needed, however, should not totally grounded from data. It implies that both deductive and inductive approaches are needed.

The Thesis aims to explore the meaning of 'peripherality in ports' (RQ1), investigate factors needed by peripheral ports to become a hub (RQ2 and RQ3) and understand stakeholders' willingness behaviour (RQ4). On the other hand, it also aims to measure and confirm which are critical factors and behaviour (RQ2, RQ3, RQ4). Therefore, to anwer the research questions, a mixed method design is chosen. Mixed methods enables to use the strength of both quantitative and qualitative methods (Bryman and Bell 2003). It also enables the researcher to 'mindfully' tailor or custom designs which could effectively answer the research questions (Johnson and Onwuegbuzie 2004). According to Greene et al. (1989 cited in Johnson and Onwuegbuzie 2004), there are five major purposes or rationales for conducting mixed methods design, which are as follows: 1) Triangulation, to look for convergence and corroboration of results from different methods and designs on the same phenomenon; 2) Complementarity, to look for elaboration, enhancement, illustration, and clarification of the results from different methods which complements each other; 3) Initiation, to look for paradoxes and contradictions which help re-frame the research questions; 4) Development, to utilise findings from one method which informs the next methods; 5) Expansion, to expand the breadth and range of research by utilising various methods and inquiry components.

Moreover, mixed method fits with the philosophical position determined, which is pragmatism. Through the history of social science research, there are three alternative schools of thought on a continuum: the purists, the situationalists and the pragmatists, as explained by Rossman and Wilson (1985) adapted by Gray (2014, p.193). Purists argue that quantitative and qualitative methods are mutually exclusive, while situationalist see them both has value and complementing each other though still from different epistemology. Further on, the pragmatists does not follow the dichotomy, and argues that *"quantitative methods are not necessarily positivist and qualitative methods not necessarily hermeneutic-socially constructed"* (Gray 2014, p.193).

Three alternative school of thought is described in Figure 3.6. This figure shows that pragmatists uses qualitative and quantitative methods to answer research questions within a single study



without any epistemological devision.

Source: Gray (2014, p.193, adapted from Rossman and Wilson 1985)

Figure 3.6 Purist, Situationalist and Pragmatist

Qualitative then Quantitative Sequence

A sequential mixed method with Qualitative then Quantitative approach is selected because it optimally supports the mixed method's fourth purpose in Greene et al. (1989 cited in Johnson and Onwuegbuzie 2004). It is to utilise findings in one method for the development of the next method. A 'sequential' mixed-methods uses quotes, codes and themes from qualitative data analysis to develop item variables, group of items and scales, respectively, for a quantitative instrument design (Cresswell 2014, p.226). The qualitative approach in this Thesis supports the explorative nature of the research questions and provides a lot of information for the development of the quantitative approach afterwards. The qualitative phase is considered more dominant in this Thesis because of its extensive data and information compared to the quantitative phase. A mixed-method design matrix and its sequence is described in Figure 3.7.

Time Order Decision

Paradigm Emphasis	Concurrent	Sequential
Equal Status	QUAL + QUAN	QUAL → QUAN QUAN → QUAL
Dominant Status	QUAL + quan QUAN + qual	***QUAL → quan*** quan → QUAN QUAN → qual quan → QUAL

Source: Johnson and Onwuegbuzie (2004)

Figure 3.7 Mixed-Method Design Matrix and Sequential Mixed-Method Design

Mixed Methods in the Research Domain of the Thesis

The history of Maritime Economics field can be traced back from the early 1920s when the maritime industry and ports were analysed descriptively based on observations with topics such as the port's condition, traffic, location, facilities and administrative structures (Heaver 2006). As an example, the description of New York's port with its heavy traffic congestion on Manhattan Island as a result of lacking adequate rail-water co-ordination (Hough, 1924, p.55 cited in Heaver 2006, p.15). At that time, quantitative data on shipping was difficult to access since shipping companies kept their business secret (Berglund, 1931 cited in Heaver, 2006). Then in the late 1950s, numerical data became more accessible and quantitative data on shipping was collected and analysed, first identified in the work on 'Shipping Economics' by Svendsen and Thorburn independently (Heaver 2006). This brings the importance of statistical data and statistical services for every port as well, which was often neglected by administrative offices in many developing ports (Nagorski 1972, pp.230-232).

In the research domain of the thesis, methods dominantly used has not been explicitly identified. Nevertheless, as explained in the previous section, studies in the port, transport and maritime economics field from 1980 to 2009 are dominantly using the following research strategies: analytical conceptual (41.2%), empirical case studies (21.4%), empirical statistical (20.5%), analytical mathematical (16.4%) (Woo et al. 2011). This implies that there are a proportion of studies using qualitative approach and another proportion using quantitative approach. The use of qualitative methods in the field is explained further in Section 3.1.4, while the use of quantitative methods in the field is explaine further in Section 3.1.5. Overall, a mixed-methods approach for this Thesis is not against the tradition of the research domain.

Mixed Methods Research Question

Research questions in a mixed method research design should have an 'overarching question' to justify the choice of a mixed method study and assure that the research purpose and questions are aligned (Teddlie and Tashakkori 2009, p.133). Overarching nature means the question incorporates both stance of qualitative and quantitative (Creswell and Plano Clark 2007). The four main research questions in this Thesis has been translated from the research gap identified in literature review Chapter 2. It is seen that the first research question on the meaning of peripherality is naturally inclined to qualitative approach, to understand in-depth and not to make generalisations. Meanwhile, the rest of the research questions are extracted to be answered by both qualitative and quantitative approach. Questions on factors needed for peripheral ports to become a hub, critical factor for each stakeholder and stakeholders' willingness to invest can be

explored qualitatively and measured quantitatively. Hence, mixed methods fit with these research questions.

3.1.4 Qualitative Phase

Qualitative Methods in Research

Qualiltative methods has advantages to answer the research questions of this thesis. It also has weaknesses; hence the thesis does not use a pure qualitative approach and uses quantitative approach to overcome that. Three main advantages of qualitative methods for this thesis are: to understand the problem context; to elicit meanings; and to support classification and analysis.

Firstly, qualitative methods are used to identify port activities, problems, and context on the phenomena of peripheral and hub ports before data are collected. It provides 'what goes on in the setting' in detail, which are critical as context in the investigation (Bryman and Bell 2003, p.295). It takes part as an exploratory study to clarify the problem, when the nature of the problem is 'unsure' (Saunders et al. 2007, p.133). It also acts as a bridge to the social world, or to the real world, to get closer to data (Silverman 2010, p.120). This first advantage contributes for the attempt to answer all four research questions of the thesis.

Secondly, qualitative methods are used to elicit 'meanings'. The use of words organised into incidents and stories are more convincing and meaningful than summarised numbers (Miles and Huberman 1994, p.1). Qualitative methods emphasises on process because it is concerned with 'events and patterns that unfold over time' (Bryman and Bell 2003, pp.296-297). It also leads to findings, new integrations, revised or new conceptual frameworks (Miles and Huberman 1994, p.1). This second advantage contributes for the attempt to answer research question-1 on the meaning of peripherality. For other research questions, it supports to understand the meaning of concentration, deconcentration and willingness. Understanding 'what' the phenomena is needed before researchers could answer 'how' and 'why' the phenomena happens (Miles and Huberman 1994). Lastly, qualitative methods are used to support classification and analysis. A 'typology' or 'classification approach' is one way to describe and analyse qualitative data (Nowotny 1971). As example, peripheral-hub ports are categorised into port hierarchy and main players in the field are categorised into 7 types of stakeholders. All four research questions in this thesis requires the researcher to classify, categorise and structurise data, codings and concepts.

Qualitative Methods in the Research Domain of the Thesis

As explained in the previous section, qualitative and quantitative methods in Maritime Economics has been used. Qualitative methods were dominantly used in the earlier days,

followed by quantitative methods. Nowadays, both methods are used. Within the field, determining qualitative or quantitative approach still depends on the specific topic, questions and research scope. Both approaches have their own unique contribution. 'People's perceptions' are seen to be used more in literature from 2000s onwards (Woo et al. 2011). Therefore, the use of qualitative methods in this thesis is not conflicting the field and considered following the trend.

Qualitative Data Collection: Semi-structured Interviews

There are four types of qualitative data gathering methods according to Rubin and Rubin (2012), which are: participant observation; documentary analysis; conversational and narrative analysis; and in-depth interviews. This thesis adopts in-depth interviews as the main qualitative data collection because it aims to capture 'rich and detailed' information, with examples, experiences, narratives and stories Rubin and Rubin (2012, p.29). Some degree of documentary analysis is used to improve the quality of this thesis, which is explained further in Section 3.3.2.

Data collection by interviews enables a researcher to understand people's behaviour, experience and motivation (Silverman 2010, p.124). Furthermore, semi-structured interviews is chosen as the appropriate research technique because it provides chances to explore and 'probe' answers from participants (Saunders et al. 2007, p.315). It enables the researcher to follow up the participant's answer (Bryman and Bell 2003, p.343). There are two types of questions: open questions and probing questions. The probing questions are intended to guide them to relate their answers with existing theories (Bryman and Bell 2003, p.351; Saunders et al. 2007, p.330).

Rubin and Rubin (2012) added one more type of questions in interviews which is follow-up questions as part of conducting 'responsive interviewing'. This means that during the interviews, the researcher listens 'to hear the meaning of what interviewees say' and follow up to gain clarity and precision (Rubin and Rubin 2012, pp.6-7). Responsive interviewing means that both interviewer and interviewee are human beings, with different personalities and they build up a relationship during the interview (Rubin and Rubin 2005). It also means the researcher is learning every second during the interview is executed, accepts and adjusts the questions and enables the researcher to 'enter the interviewee's world' (Rubin and Rubin 2012). Since this thesis is an exploratory type of research, responsive interviewing is very helpful.

More aspects to be considered during in-depth and responsive interviewing are as follows (Rubin and Rubin 2005, 2012): First, researcher should follow an interpretive constructionist philosophy, also mixed with critical theory and practical needs during the interviews. Second, main questions of the interview should be translated from the initial research questions of the

study. It should be carefully thought and expressed in a way so that interviewee's responses are not restricted or predetermined by it. Third, if interviewees are having difficulties to answer or express their perception, then the questions should be translated into easier wordings or asked more related to their experiences. Fourth, avoid using scientific jargons in the questions because it will seem mysterious and confusing to interviewees.

Since peripherality, peripheral port challenge and other terminologies used in this study are not widely used by practitioners as interviewees, hence it should be asked in a careful and simplified way. Responsive interviewing could result in various responses for each interviewee. Hence, an interview protocol was used to maintain that the interview topic was still in the scope of the study. Interview questions are developed using these considerations and explained next.

3.1.5 Quantitative Phase

As explained before, the purpose of quantitative methods in a mixed-methods research in Greene et al. (1989 cited in Johnson and Onwuegbuzie 2004) is to utilise findings from the qualitative method for the development of a quantitative model. Quantitative methods enable researchers to measure concepts in variables, test and validate existing constructed theories about particular phenomena and generalize the research finding when it has been replicated on different populations and subpopulations (Johnson and Onwuegbuzie 2004, p.19).

Measurement in Social Science

The history of measurement in social science is explained by De Vellis (2017). Measurement started from fields with tangible objects such as astronomy, physics or physical science, psychophysics. Sir Isaac Newton was the first to use an average of multiple observations in astronomical phenomenas in the late 1660s and early 1670s (Buchwald 2006 cited in De Vellis 2017, p.6). Then it developed to fields with intangible objects to measure such as psychometrics, mental testing, assessment for mental illness, psychology and social sciences. Moreover, after Karl Pearson and Charles Spearman developed statistical tools (separately) to measure correlation and factor analysis in the early 20th century then psychometrics and mental testing become more formalised.

De Vellis (2017, p.13) further explained that measurements in social sciences, theory becomes more critical because the more researchers understand about the phenomena, abstract relationships and theory then they will be better equipped to develop scales that are reliable, valid and usable. Measurement scales are tools used to measure phenomena that the researchers believe exists and cannot assess directly (De Vellis 2017, p.15). Terminology widely used in

statistics are that measurement scales are represented by a 'latent variable' or 'construct' which are variables which can not be measured directly; and 'item variables' which are variables which can be measured directly by surveys (Hair et al. 2010, pp.634-635).

Quantitative Methods in the Research Domain of the Thesis

Studies on stakeholders in maritime economics listed in Table 2.22 and categorised litertature detailed in tables in Appendix 3 is tested by interviews and survey questionnaire. Perception using survey questionnaire are mostly analysed using factor analysis or Analytical Hierarchy Process (AHP). Studies which do not use stakeholders' perception are mainly using secondary data such as port throughput, shipping cargo data, Herfindahl-Hirschman index, Gini Index and other measurements (as explained earlier in Section 2.2.2 on Hub Ports).

Online Survey

Survey as a data collection method has the advantage to gather information directly from participants, which could include many things such as their ideas, feelings, health, plans, beliefs, and social, educational, financial or background (Fink and Kosecoff 1998, p.1). There are various types of survey which should be chosen according to resources that the researcher has, such as by questionnaires or interviews, and methods of administration such as by mail, telephone or computer (Fink and Kosecoff 1998). Choosing which type of survey dissemination method could also be justified by its cost. Miller and Salkind (2002, pp.318-319) explained that mail questionnaire survey compared to personal interview and telephone survey is favourable for having lowest relative cost, higher accuracy of information and overall reliability and validity.

Nowadays online surveys are commonly used. The difference compared to traditional mail surveys is that the survey questionnaire invitation is sent by electronic mail (e-mail) using a link to the survey site and answers are collected online, internet based. According to Sekaran (2003, p.251), online questionnaires have advantages which include being easy to manage, able to reach different geographical locations, cheaper, easier to reach respondents and providing flexibility since respondents can fill in the survey at their convenience. Meanwhile, Sekaran (2003, p.251) also explained the disadvantages of online questionnaire that respondents must be able to use computers, internet access and willingness to fill it in.

In this Thesis' quantitative phase, a survey questionnaire was used mainly because it enables data collection from long distance locations relatively cheaper, with participants across the Indonesian archipelago. Important considerations related to online survey and the technology used are explained by Dillman et al. (2009). They argue that technology has made the nature of

survey becoming easier to distribution, however, less humane, hence they suggested to keep it personalised (Dillman et al. 2009). Their arguments are compiled in Table 3.6, which shows that in the 1960s, surveys were conducted with direct human interaction, supported by trust, time and attention by participants. This is reducing as time goes by.

Table 3.6 Changes in Survey Characteristics by Dillman et al. (2009)

Characteristics	Through the 1960s	1970s through 1980s	1990s to the present
Human interaction	**High**	**Medium**	**Low**
	face-to-face through in-person visits to respondent homes	remote through a telephone connection	Encounter is more likely to be with a machine or its products
Trust that the survey is legitimate	**High**	**Medium**	**Low**
	encouraged by interviewer presence, appearance and sincerity	encouraged through voice inflection, ability to listen and request additional information	Because of possibility that survey is fake and potentially harmful to respondent
Time involvement with each respondent	**High**	**Medium**	**Low**
	interviewer goes to respondent and obtains information one-on-one	one-on-one but contact effort is minimal	Minimal to no time with individual respondents
Attention given to each respondent	**High**	**Medium**	**Low**
	because of time to find and interview each respondent	because of placing calls one after another	Mass e-mails
Respondent control over access	**Low**	**Medium**	**High**
	households generally accessible	unlisted numbers, voice mail and call monitoring	Caller-ID, call blocking, e-mail filters
Respondent control over whether to respond	**Low**	**Medium**	**High**
	required breaking off human interaction	ease of hanging up telephone	Increased disclosures required to be communicated, social support for refusing

Source: Dillman et al. (2009, p.2).

Scale Development and Survey Design

Guidelines for scale development are provided by De Vellis (2017) in 7 steps, which are: determine what to measure supported by theory or conceptual formulation; generate item pool or item variable to test the strength of the latent variable; determine format for measurement; expert review; include additional items for validation; administer items to a development sample or pilot; and evaluate items. Scale development relates to the questions to be asked in the survey. Furthermore, the overall appearance of the survey questionnaire itself needs to be designed. A well designed and administered questionnaire leads to a significant and accurate assessment (Fink and Kosecoff 1998). Table 3.7 highlights questionnaire design elements by Fink and Kosecoff (1998) which consist of: reclarifying the relationship between method, problem and hypothesis; formulate the question; organise and pretest the questionnaire.

Table 3.7 Questionnaire Design and Construction by Fink and Kosecoff (1998)

No	Critical Considerations	Tips
1	Reclarify the relationship of the method to the problem and hypotheses.	
2	Formulate the questions	• Keep the language appropriate to the level of the respondents. • Use words that have the same meaning for everyone and avoid long questions. • Do not assume a priori that your respondents possess factual information or firsthand opinions. • Establish the frame of reference you have in mind. • In forming a question, either suggest all possible alternatives to the respondent or don't suggest any, also consider to protect a respondent's ego. • Questions on unpleasant experience, give respondents a chance to express positive feelings first so that they are not put in an unfavourable light. • Decide whether you need a direct question, an indirect question, or an indirect question followed by a direct one. • Decide whether the questions should be open (allowing for a range of answers) or closed (allowing for only one or a few answers). • Decide whether general or specific questions are needed. • Avoid ambiguous wording and biased or leading questions. • Phrase questions so that they are not unnecessarily objectionable. • Decide whether a personal/impersonal question will obtain the better response. • Questions should be limited to a simple idea or a single reference.
3	Organise the questionnaire.	• Start with easy questions that the respondent will enjoy answering. • Don't condition answers to subsequent questions by preceding ones. • Use the sequence of questions to protect the respondent's ego. • Decide whether one/several questions will best obtain the information desired. • With free-answer questions, it is sometimes helpful to have the questions in pairs, asking for the pros and cons of a particular issue. • Keep open-ended questions to a minimum. • Topics and questions should be arranged so it makes the most sense.
4	Pretest the questionnaire.	• Select and interview a number of respondent representative of those you expect to survey. Consider how you can present the strongest possible sponsorship. • Never omit pretesting, select paper and typeface carefully. • Examine each of the techniques discussed for increasing the return rate of the questionnaire and decide which will maximize returns for you.

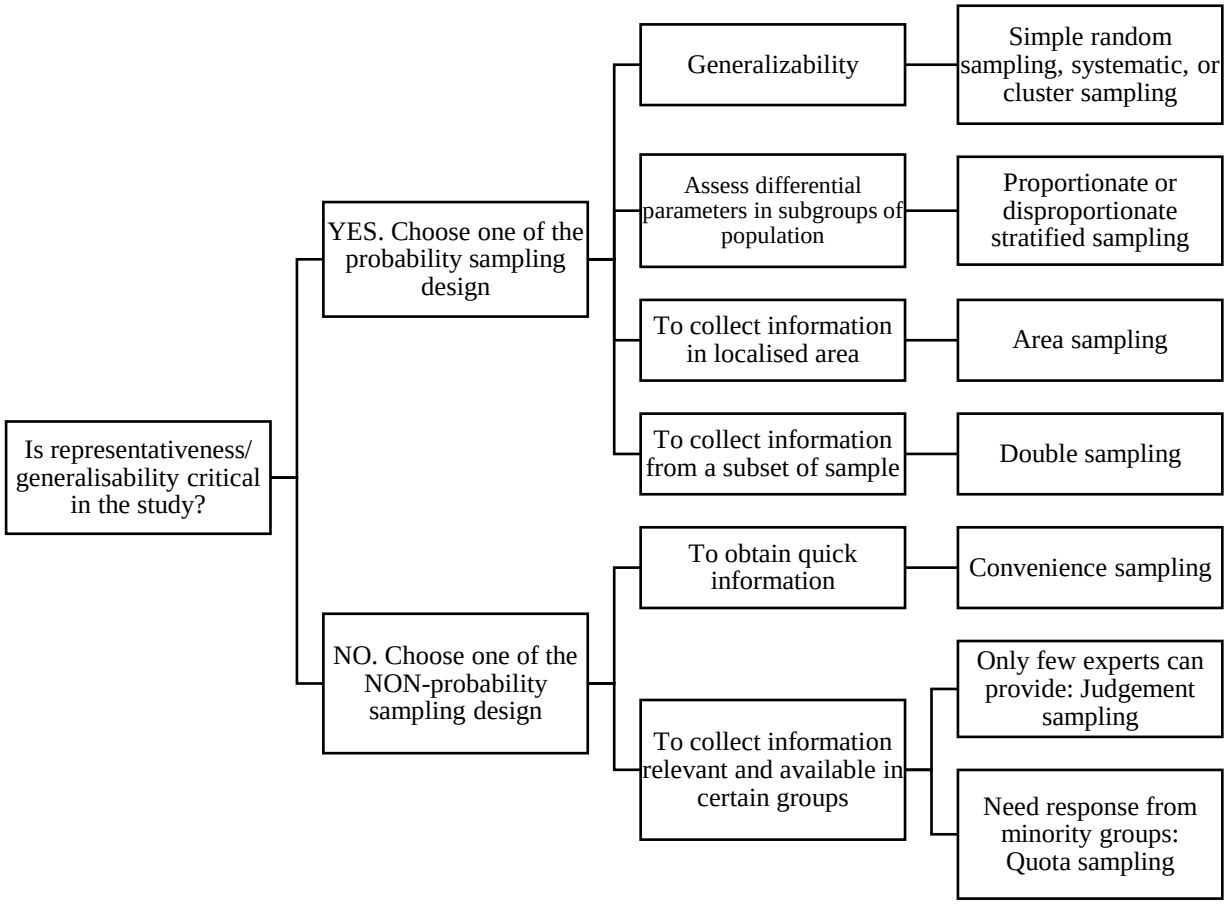
Source: Fink and Kosecoff (1998, pp.301-304)

3.1.6 Data Sampling: Non-Probability Sampling

For both the qualitative and quantitative phase of this thesis, non-probability sampling is used because the objective is to understand a specific case and not to be generalised. Non-probability sampling means that elements in the population could be chosen as sample subjects without concerning any probability issue and generalizability of the research is not the main objective (Sekaran 2003, pp.276-279). In studies related to a unique and limited population, this might become the only way to obtain data. Sampling techniques are determined by the purpose of study as described in Figure 3.8 by Sekaran (2003, p.281).

Furthermore within non-probability sampling, there are three techniques each having its own advantages and disadvantages as seen in Table 3.8 (Sekaran 2003, p.280). In Table 3.8, it is seen that non-probability sampling could be determined by convenience, expert judgement or by a

certain quota. Teddlie and Tashakkori (2009, pp.173-175) categorised non-probability sampling more detailed by its aims as described in Figure 3.9: to achieve representativeness; to sample unique cases; or to comply a certain sequence.



Source: Sekaran (2003, p.281)

Figure 3.8 Sampling Techniques

Table 3.8 Types of Non-probability Sampling

Types	Description	Advantages	Disadvantages
Convenience sampling	Respondents are selected based on the most easily accessible.	More convenient, less time, less expensive.	Not generalisable.
Judgement sampling	Respondents are selected based on their expertise.	Could be the only meaningful way.	Generalisability is questionable to population.
Quota sampling	Respondents are selected based on targeted groups in a predetermined number or quota.	Useful to support minority participants that are critical in the research.	Not easily generalisable.

Source: Sekaran (2003, p.280)

Non-probability sampling used for qualitative interviews in this thesis are convenience sampling, judgement sampling and quota sampling. According to Sekaran (2003, p.277), judgement sampling is done when the researcher needs to gain information from the most relevant people and position. Quota sampling is done when the researcher needs to ensure that the different respondent groups are sufficiently represented using a certain quota Sekaran (2003, p.278). This

also includes typical case sampling, extreme case sampling and political case sampling, because of the need to achieve representativeness or comparability (Teddlie and Tashakkori 2009).

Sampling for representativeness or comparability	Sampling special or unique cases	Sequential sampling
• Typical case sampling • Extreme or deviant case sampling • Intensity sampling • Maximum variation sampling • Homogeneous sampling • Reputational case sampling	• Revelatory case sampling • Critical case sampling • Sampling politically important cases • Complete collection	• Theoretical sampling • Confirming and disconforming cases • Opportunistic sampling • Snowball sampling

Source: Teddlie and Tashakkori (2009, pp.173-175)

Figure 3.9 Types of Non-probability Sampling by Aim

Each stakeholder type, which is determined during preliminary interviews, should be represented. Furthermore, within the stakeholder type a typical case and extreme case should also be represented. As an example, within the stakeholder Shipping Lines, both domestic and international shipping lines should be covered. Another example, within the stakeholder Central Government, prominent Ministries in Indonesia's government related to maritime transport should be covered. A certain degree snowball sampling is also used, because the researcher was introduced to new respondents which were referred by interviewees, outside the researcher's extended professional network.

Meanwhile, for quantitative survey the techniques used are judgement sampling, quota sampling and snowball sampling. Quota sampling is particularly critical in the survey phase because it needs to be confirmed that the number of respondents fulfil requirements for statistical power.

3.1.7 Theoretical Lens: Stakeholder Theory

The maritime transport industry involves various stakeholders. Based on Section 2.1 to Section 2.4, the development of ports in peripheral locations as hubs, related to concentration and deconcentration factors, also the willingness of stakeholders to invest are explained. However, it is still unclear if a port or shipping line is willing to expand its business to more peripheral locations (deconcentration), are they trying to gain more profit or are there also social responsibility issues? Government also plays important role in small and peripheral ports as explained in Section 2.1.3 since developing infrastructure in peripheral locations. Moreover, there are various other stakeholders involved in maritime economics and transport, as explained in Section 2.4.2.

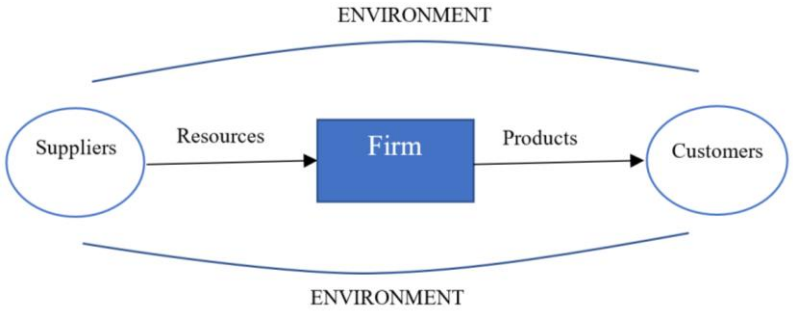
Theoretical lens helps to shape approaches to the empirical reality, to provide 'a way of seeing' and 'not seeing' things (Astley and Van de Ven 1983 cited in Touboulic and Walker 2015, p.20). In the field of Maritime Economics, the use of theoretical lens in research is uncommon. In contrast, it is widely used in the field of Sustainable Supply Chain Management (SSCM) (Touboulic and Walker 2015). A comprehensive systematic review on theories in SSCM has been done by Touboulic and Walker (2015), their results showed that SSCM are predominated by Resource-based View, Stakeholder Theory and Institutional Theory. In their discussion, beside having the 'green' and 'social' aspects, SSCM is also viewed operationally as having internal-external business processes and collaboration between supply chain partners. This view is similar with the aim of this Thesis, which is empowering peripheral port to become a hub supported by 'collaboration' of stakeholders. Resource-based Theory stresses more on a firm's competitive advantage while Institutional Theory stresses more on external social pressure (Touboulic and Walker 2015), which are not the 'way of seeing' this Thesis research. Therefore, Stakeholder Theory (ST) as a theoretical lens is suggested to support this research.

ST was introduced in the field of Business studies by Edward Freeman from his book "*Strategic Management: A Stakeholder Approach",* published in 1984 (Dickson et al. 2009). A tragic historical event, the Triangle Waist Company factory fire in 1911 in New York that killed 141, triggered the emergence of social responsibility movement and ST (Dickson et al. 2009). Eventhough ST emerged a long time after the incident, it brought movements from various stakeholder groups and social actions, united together to improve working conditions (Dickson et al. 2009).

Before ST, business was conducted to gain maximum profit, only considering the needs of shareholders, without any noble 'purposes' of the business and creating values to its stakeholder (Freeman 1984; Freeman et al. 2004; Freeman 2012). Freeman (1984) pointed out the need for business in the 1980s to change their point of views, where successful business is achieved only when they satisfy suppliers and customers (Figure 3.10), into satisfying the whole stakeholders related with the business (Figure 3.11).

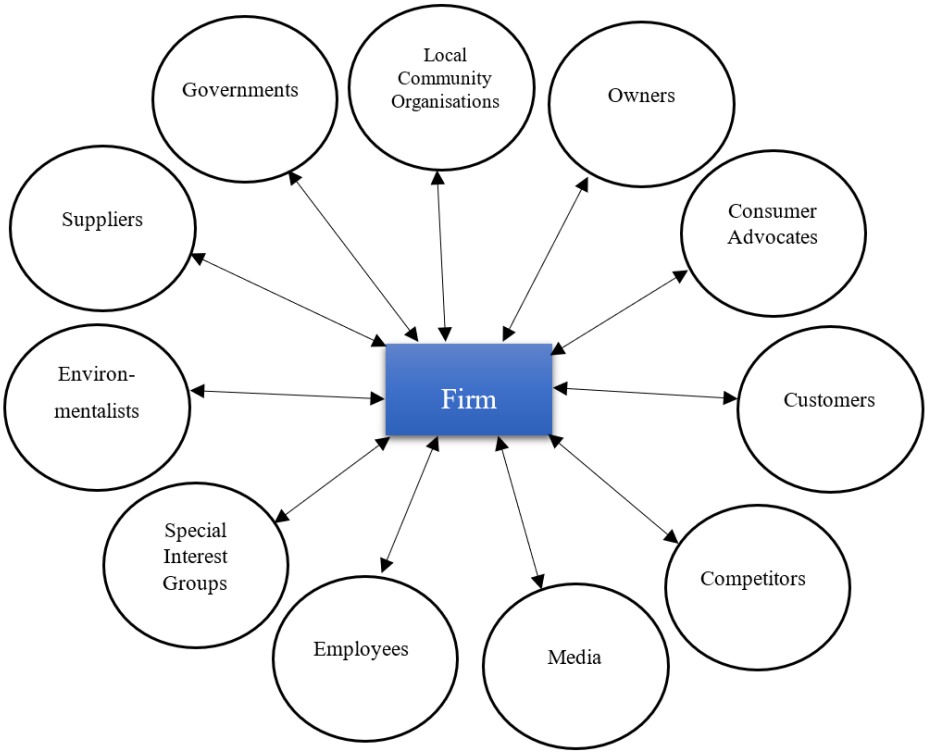
Freeman (1984) explained that the word 'stakeholder' was first used by the Stanford Research Institute in 1963 in an internal memorandum, implying that the stockholder was the only group to influence the management. Based on the Stakeholder View of Firm in Figure 3.11, Freeman argued that two issues emerge. First, is the need for new theories and models to be able to manage these stakeholders and understand the strategy for each group (Freeman 1984, p.26). Second, is

the need for integration and not managing each stakeholders in isolation (Freeman 1984, p.26). Critical definitions of stakeholder explained by the prominent researchers in the development of ST are described in Table 3.9 as follows.



Source: Freeman (1984 p.5)

Figure 3.10 The Production View of Firm by Freeman (1984)



Source: Freeman (1984 p.25)

Figure 3.11 Stakeholder View of Firm by Freeman (1984)

Identifying different stakeholders and their interactions are important for organisations. Each stakeholder should be treated equal, fair and ethically for the long run because business is not only aimed to gain profit (Freeman 1994; Clarkson 1995; Sternberg 1997). Case studies identifying stakeholders by managers and CEO, such as by Parent and Deephouse (2007) and Hutt (2010) has shown that identifying a company or organisations's stakeholders are beneficial to understand their strategy and perceived salience.

Table 3.9 Definition of Stakeholders in Stakeholder Theory

Source	Definition of Stakeholders
Freeman (1984, p.25)	"*group or individual who can affect or are affected by the accomplishment of organisational purpose".*
Donaldson and Preston (1995)	*"persons or groups with legitimate interests in procedural and/or substantive aspects of corporate activity"*
Clarkson (1995, p.106)	"*persons or groups that have, or claim, ownership, rights, or interests in a corporation and its activities, past, present or future".* • Primary stakeholders are *"groups without whose continuing participation the corporation cannot survive",* includes investors, suppliers, customers, employees, governments, political groups, trade associations, and communities. • Secondary stakeholders are *"those who influence or affect, or are influenced or affected by, the corporation, but they are not engaged in transactions with the corporation and are not essential for its survival*", includes competitors and the media.
Dickson et al. (2009, pp.110-113)	Stakeholders are grouped into the following categories based on social responsibility issues. • Responsibility stakeholders: financial, legal, or operational responsibilities resulting from regulations, contracts, policies or codes of conduct that the firm must deals with. They are employees or workers. • Influence stakeholders: groups having influence or decision-making power. They are legal authorities, pressure groups and the media. • Proximity stakeholders: internal stakeholders which interact most frequently with the firm such as management, outsourced employees, local communities and long-standing business partners. • Dependency stakeholders: • Representation stakeholders: • Policy and strategy stakeholders:

Source: Author

Moreover, Friedman and Miles (2002) argued that by identifying stakeholders, it could be understood that different stakeholders can influence organisations in different ways, one might have more influence than others, one might and might not be considered legitimate by organisations, and that relationships could change over time. They developed a model adopting from Archer (1995) to map stakeholders by its compatibility and legitimacy (Friedman and Miles 2002). Their model is described in Figure 3.12. The four regions in the model are explained as follows (Friedman and Miles 2002):

- A (Necessary – compatible): critical relations such as between shareholders and corporations, between top managers and corporations and among partners.
- B (Contingent – compatible): relations where there is no formal contract and no direct relationship, such as with the general public or trade asociations.
- C (Contingent - incompatible): relations where there is no implicit or explicit contract, such as with the NGOs.
- D (Necessary - incompatible): relations which needs to be uphold eventhough it might have incompatible interest.

The Stakeholder Configuration Model by Friedman and Miles (2002) is commonly used to map the stakeholders of one individual firm. Since the Thesis' unit of analysis is the Indonesian maritime transport system (see 3.1.2), hence, the model is extrapolated in a larger view of the maritime network and adopted to identify stakeholders as sources for data collection. Stakeholders in the Necessary – Compatible and Necessary – Incompatible are chosen as respondents of the study (colored in blue, in Figure 3.12), for both qualitative interviews and quantitative survey, because they are the most relevant parties supporting Indonesia's maritime transport. Stakeholders in the Necessary – Compatible are port operators, shipping lines, cargo owners/shippers and freight forwarder/logistics companies, whom are related to the movement of goods (Lin 2015). Meanwhile in the Necessary – Incompatible are the central government and ministries, local government, investors/financial institutions.

Stakeholder Configuration Model by Friedman and Miles (2002)	
Necessary - Compatible	**Contigent – Compatible**
• Shareholders • Top management • Partners	• General public • Companies connected through common trade associations/initiatives
Necessary - Incompatible	**Contigent – Incompatible**
• Trade unions • Low-level employees • Government and their agencies • Customers • Lenders • Suppliers and other creditors • Some NGOs	• Some NGOs • Aggrieved or criminal members of the public

Source: Friedman and Miles (2002, p.8)

Stakeholder in the Thesis adopted from Friedman and Miles (2002)

Necessary - Compatible	**Contigent – Compatible**
• Port operators • International and domestic shipping lines • International and domestic cargo owners • Freight forwarder/logistics companies	• Academicians • Consultants • General public
Necessary - Incompatible	**Contigent – Incompatible**
• Central government and Ministries • Local government • Investors/Financial Institutions	• Politicans and Political parties • NGOs/related associations • Local human resources

Source: Author

Figure 3.12 Stakeholder Configuration Model by Friedman and Miles (2002) and Stakeholders in the Thesis

3.1.8 Ethical Considerations

Data collection was conducted three times in this study, which were preliminary interviews, main interview, and online survey. Issues on ethics in this study are identified using 4 ethical principles by Diener and Crandall (1978) cited in (Bryman and Bell 2003, pp.539-545) as follows.

First on ‘Harm to participants. Mentioning the company name and the participant interviewed could potentially harm their career reputation (Bryman and Bell 2003, p.541) because they could be ‘victimized’ by the company or by the government. Therefore, confidentiality and anonymity of the names are important. Respondents are reminded that names are anonymised and kept confidential. All data collected remains confidential to the researcher and will not be made available to any other party, including the sponsor. The data was anonymised, and email identification data was kept separately from the dataset. There are no gender and age discrimination issues hence it will not be asked in the interview and survey. Respondents were spread across 34 provinces and different islands in Indonesia. Location information is disclosed, since Indonesia and its provinces brings context to the research.

Second, on ‘Lack of informed consent’. Respondents and/or companies as participants has ‘right to refuse’ (Bryman and Bell 2003, p.542). Consent from participants will be asked before interviews or survey is conducted. This ensures the clarity of ethical considerations for respondents. If they do not give consent, it does not oblige respondents to participate in the interview or online survey. Even if the company or institution gatekeeper, where respondents work at, approves to participate in the study, individual respondents still have the right to refuse. Respondents are reminded that participation in this research is entirely voluntary and each respondent can refuse to answer, withdraw or end the interview and/or survey at any time without giving a reason.

Furthermore, since the author is an employee of a port operator company, the author explains everything related to the research, e.g. research design, interview questions, survey questions, quantitative data and customers’ contacts needed through the ‘gatekeeper’. It is done by sending a formal email and phone call to Human Resource Director, Commercial Director and Corporate Secretary.

Third, on ‘Deception’. In order to avoid negative perceptions and deception on the study as an issue for participants, various actions were taken. In the introduction/invitation email or personal message before data collection was conducted, the author clearly stated her background as a PhD student, as an independent researcher and that the PhD research is supported by the port company where she is employed. The research purpose was clearly explained. Respondents are informed at the beginning that this is independent research, which will not influence or were influenced by any party including the sponsor. Furthermore, respondents could request a summary of the research findings if they contacted the author and/or supervisor’s through email. The summary

document to the supervisor and sponsors are in the same form as for participants, after completion of the research (submission of PhD Thesis and successful viva voce).

Lastly, on 'Invasion of privacy'. A research study should not 'intrude' on the respondents privacy (Bryman and Bell 2003, p.544). The author must not 'apply pressure' to colleagues or managers to coordinate (Saunders et al. 2007, p.182). Responses including their perception and company's strategic plans are important information, which is also their privacy. Therefore, the author keeps them confidential and not crossing the line. This is unless the plans are already published in the press release or explicitly given permition to mention them in my research. Respondents are reminded that participation is not linked in any way with their job performance. Respondents are informed that it is not possible to trace any respondents' name and email address with their interview and survey response. If they request the summary document, their email address identifier will be confidential only to the main researcher.

3.2 Qualitative Phase Research Process

This section explains the research process in the qualitative phase. It consists of development of main interview protocol, qualitative data analysis, reliability and validity in qualitative data analysis, and interview respondents' profile.

3.2.1 Development of Main Interview Protocol

As explained in the previous section on interview questions, the questionnaire needed to be tailored for the interviewee or respondents from the main research questions because in nature it is too broad and abstract for them, also to make it easier to elicit their experience (Rubin and Rubin 2005). Therefore, this section describes the translation process from the four main research questions to become the interview protocol. Table 2.24 have described and located the main research questions to be answered by qualitative methods. It is then used together with findings from preliminary interviews to 13 respondents in a port operator company and modified to develop the main interview questions as seen in Table 3.10. The main points to become interview questions are detailed in the last column of Table 3.10, which is then used to build the interview protocol. More on the preliminary interviews is explained in Appendix 2.

There are five main tasks in the interview protocol. **First task** is to ask the respondent's profile as introduction. Their profile or background are detailed such as the company or government institution they work in (port operator, shipping line, etc.), its main service or production, their role in the company or institution, and how long they have been working there. During the introduction, respondents are also explained and reminded of the research objective, which is

specifically about hub port development in Sorong, in the east region of Indonesia, with the addition of showing the map (which is Figure 1.3 in this Thesis). The purpose of showing an Indonesian map in the Interview Protocol (which is Figure 1.3 in this Thesis) is to familiarise or remind the respondent of the Eastern Indonesia case. It also supports or guides the respondent when they need to explain anything related to geographical positions. The map is given to them so that they can scribble or write on it and their scribbles are then used by the author for further analysis. The end of the introduction task is to confirm their consent in the research and consent to be recorded.

Second task is Part-1 of interview to ask the meaning of peripheral in general to understand their perception, why they perceive it, and whether all Indonesian ports are peripheral. **Third task** is Part-2, then **fourth task** is Part-3 to elicit their willingness to invest. **Last task** are the confirmatory questions. In total there are 6 questions in Part-1, 5 questions in Part-2 and 3 questions in Part-3 which overall is considered enough to make an hour of interview per respondent. The sequence of asking the questions might differ in each interview since it is a semi-structured interview and each respondent might respond in a unique sequence. However, it is consistent that the confirmatory question is given in the end. Most of the interviews takes 1 hour. The overall interview protocol is depicted in Table 3.11.

Table 3.10 Development of Questions for Main Interview

Research Question	Keyword	Sub Research Question	Insights from Preliminary Interviews*	Main Points to become Interview Questions
RQ1: What is peripherality in the context of maritime economics?	Perception	• What are the levels of peripherality? • What is considered as a potential peripheral port and in what level of peripherality? • What are characteristics of a potential peripheral port? • What are potential benefits of peripheral ports?	• Characteristics of peripherality. • The opportunities, threat and expectation of port development in peripheral locations. • Motivation of a particular port operator to develop peripheral port. • Related stakeholders involved in peripheral port development. • Each stakeholder has different way of perceiving peripheral locations. • Each stakeholder has different needs and expectations from other related stakeholders.	<u>Peripherality</u> 1) Familiarity with peripherality. 2) Meaning of peripherality. 3) Importance of Peripherality. 4) Scope of peripherality. 5) Business in peripheral locations. 6) Plans to expand business in peripheral locations. <u>Peripheral Ports</u> 1) Criteria of peripheral ports. 2) Importance of peripheral ports. 3) Benefit of peripheral port as a hub. 4) Measuring growth.
RQ2: What are the underlying concentration and deconcentration factors for developing a successful hub port in a peripheral location?	Factors Needed	• What are the concentration factors in Indonesia's port development? • What are the deconcentration factors in Indonesia's port development?		
RQ3: What are the critical factors for each stakeholder?	Critical Factors	• What are the concentration-deconcentration factors for each stakeholder? • How should transhipment services or other value-added services be provided?		Not related because quantitative methods is used for RQ4.
RQ4: What are stakeholders' willingness to invest in peripheral ports?	Willingness	• How important are peripheral port development for each stakeholder? • What are their willingness to invest in peripheral ports? • Which main stakeholder should be the coordinator or integrator in peripheral port development?		<u>Willingness</u> 1) Main stakeholders in peripheral port development. 2) Willingness to invest in peripheral ports. 3)Critical facilities needed in peripheral ports

Source: Author, *)in Appendix 2

Table 3.11 Interview Protocol

Introduction

- Which company or government institution do you work in (port operator, shipping line, etc.)?
- What are its main service or production?
- What are your role in the company or institution?
- How long have you been working here?

- ✓ Explanation and reminder of the research objective and research context in Eastern Indonesia, especially Sorong.
- ✓ Respondents are shown an Indonesian map in Figure 1.3.
- ✓ Confirm respondents' consent to be interviewed and to be recorded.

Part-1 Peripherality

1. Are you familiar with the term peripheral / peripherality?
2. What does the term peripherality mean to you?
3. How important do you think peripheral locations are? Why?
4. How far a location is considered peripheral? e.g. feeder services / pioneer services, product sales or production, or projects in the government
5. Is your business related with peripheral location?
6. Are there plans to expand your business in more peripheral locations? Why?

Part-2 Peripheral Ports

1. What are criteria of peripheral ports?
2. Are ports in peripheral locations important for your business/projects? Why?
3. What are potential / benefits of peripheral ports (as hubs) for your business/projects?
4. What are the criteria for a potential peripheral port to become hub?
5. How do you measure growth in the peripheral?

Part-3 Willingness to Invest

1. Who are the main stakeholders in peripheral port development?
2. Are you willing to invest in peripheral ports?
3. What are the critical facilities that should be developed for ports in peripheral locations?

Confirmation Questions

- Is peripherality important for you?
- Are you willing to invest in peripheral ports/terminal?

Source: Author

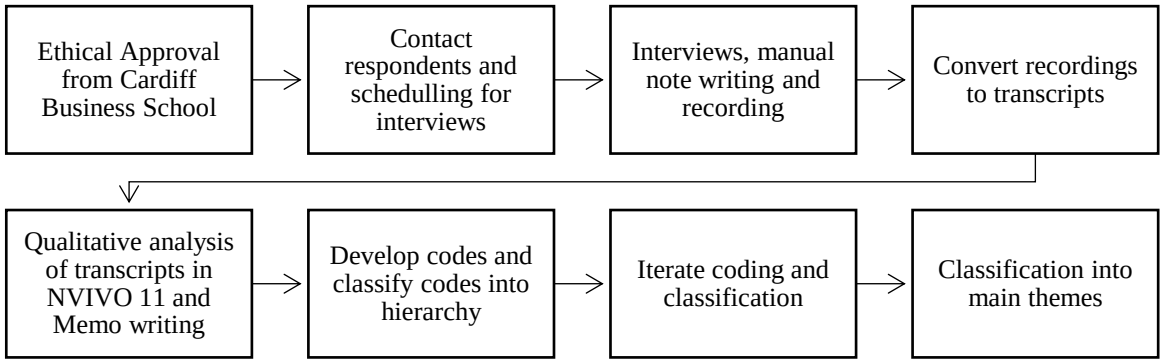
Besides asking their perception of peripherality, the interview protocol also asks the importance of a peripheral location. This is in line with the interview questions by Yang et al. (2016) to identify port choice strategy of container shipping lines. In their interview, the question is worded as follows: "*Do you think the location is important when selecting the calling ports of*

your shipping routes? How does it affect your decision process?" (Yang et al. 2016, p.152). These questions of importance are also asked to trigger respondents thinking about which concentration and deconcentration factors are important.

3.2.2 Qualitative Data Analysis

After the interview protocol was approved by the Ethichs Committee of the school, respondents were contacted, and interviews are scheduled. Respondents were contacted formally by email and personal messaging application *Whatsapp*, which is heavily used as communication application in Indonesia for personal and office/business environment. The interview process took place in Jakarta, capital city of Indonesia, from December 2016 to January 2017. Respondents from outside of Jakarta were interviewed by telephone. Interviews were all scheduled according to the respondents' convenient time, hence in a day there could be a minimum of 0 interview and a maximum of 4 interviews. Besides the use of a voice recorder, a research assistant was also used as support to write down respondents' answers as back up data. This was helpful to support doing responsive interviewing, as explained previously in Section 3.1.4. Probing questions and follow-up questions are asked to respondents' answers to get a better picture of their arguments. The following Figure 3.13 explains the process of qualitative data collection and analysis.

Figure 3.13 Qualitative Data Analysis Flow Diagram



Source: Author

Data Coding and Thematic Analysis

After interviews were conducted, recorded interviews were then converted to transcript and read thoroughly. Two respondents that are unwilling to be recorded, hence only manual written notes were used as their transcript. Next, they were analysed using NVIVO 11 software, in 3 phases as suggested by Miles et al. (2014). First, 'jottings' were made which are notes, comments, inferences, personal reaction or thoughts on the transcription to help manage emergent reflections (Miles et al. 2014, p.94). These jottings are written in NVIVO's memo

feature. Second, the first cycle of coding was done to label the 'chunks of data. Most of the codings are *simultaneous coding* which uses two or more codes because one chunk of data has multiple meanings (Miles et al. 2014, pp.74-81). Third, the second cycle was done which was coding to groups or categorizing the codes from the first cycle with the same pattern into themes (Miles et al. 2014, pp.86-88). The second and third cycle was conducted iteratively. The codes and themes are described in each findings section of Chapter 5, Chapter 6 and Chapter 7.

Related to the use of language, there are 8 respondents using English language in the interview (17.3%) compared to 38 using Indonesian language. The interviews in the Indonesian language are also transcribed in Indonesian. The main reason is to keep the meaning and expression of respondents. However, during analysis they were converted into English codes and memos in the NVIVO software. The author is confident with this process of using dual language (interview and transcription in Indonesia while analysis in English), since the author has been using both of these languages since the age of 5. Any problems related with language are also discussed with the research assistant who attended and taok notes to all of the interviews. After the analysis, all codes and memos in English were read and verified by supervisors.

The second cycle of coding is also known as thematic analysis (Miles et al. 2014). Braun and Clarke (2006) discussed the benefits of thematic analysis, and the most relevant aspect for this research was its flexibility, useful to summarise key features of a large body of data, enabling similarities and differences across data to be highlighted and its usefulness producing qualitative analysis related to informing policy development (Braun and Clarke 2006). Moreover, they also developed a list of criteria to support thematic analysis (Braun and Clarke 2006), shown in Table 3.12. A detailed list on the types of first cycle codings by Saldana (2016, pp.80-206), which are used as foundations to create codings in this research, are shown in Table 3.13.

NVIVO 11 Software

NVIVO 11 Software is a Qualitative Data Analysis Software (QDAS) used in this Thesis to develop and classify codes into themes. Computer assisted methods in qualitative data analysis are benefial compared to manual aproaches. It enables the researcher to improve quality and reduce time to extract, condense, summarise data, also support transformation of data by giving ratings, judgments and picking representative quotes (Miles and Huberman 1994, p.98).

Table 3.12 Criterias in Thematic Analysis by Braun and Clarke (2006)

Process	No	Criteria
Transcription	1	The data have been transcribed to an appropriate level of detail, and the transcripts have been checked against the tapes for 'accuracy'.
Coding	2	Each data item has been given equal attention in the coding process.
	3	Themes have not been generated from a few vivid examples (an anecdotal approach), but instead the coding process has been thorough, inclusive and comprehensive.
	4	All relevant extracts for all each theme have been collated.
	5	Themes have been checked against each other and back to the original data set.
	6	Themes are internally coherent, consistent, and distinctive.
Analysis	7	Data have been analysed – interpreted, made sense of – rather than just paraphrased or described.
	8	Analysis and data match each other – the extracts illustrate the analytic claims.
	9	Analysis tells a convincing and well-organised story about the data and topic.
	10	A good balance between analytic narrative and illustrative extracts is provided.
Overall	11	Enough time has been allocated to complete all phases of the analysis adequately, without rushing a phase or giving it a once-over-lightly.
Written report	12	The assumptions about, and specific approach to, thematic analysis are clearly explicated.
	13	There is a good fit between what you claim you do, and what you show you have done – i.e. method and reported analysis are consistent.
	14	The language and concepts used in the report are consistent with the epistemological position of the analysis.
	15	The researcher is positioned as active in the research process; themes do not just 'emerge'.

Source: Braun and Clarke (2006)

Table 3.13 Types of First Cycle Codings by Saldana (2016)

Type of Codings (cd.)		Meaning
Grammatical	Attribute cd.	Context, socio-demographic info
	Magnitude cd.	Add numbers/symbols from the interview words or "phrases" to indicate intensity, frequency, direction, presence or evaluative content.
	Subcoding cd.	There is a parent and child code, like a hierarchy, for multiple participants, sites or variety of data source.
	Simultaneous cd.	Apply to or more different codes to a single qualitative datum because it has multiple meanings, make sure it is justified.
Elemental	Structural cd.	Identify and recap the frequency of its appearance in a hierarchy.
	Descriptive cd.	Straight forward, noun based-explaining the datum. Does not give much insight compared to other codings.
	In vivo cd.	Literal, verbatim, "in that which is alive", the terms by the participants themselves. Helps 'crystallize and condense' meanings.
	Process cd.	Human action, with gerunds-"ing", search for routines, rituals, rhythm, repetitive. Study the phases or stages.
	Initial cd.	Break down into discrete parts, closely examines, compares for similarities and differences. Search for properties, dimensions of categories, criterias. Could be descriptive, conceptual or theoretical. Example: process- "choosing friends", properties- "criteria for friendship".
	Concept cd.	Assign meso or macro levels of meaning to data, concept or idea as nouns, not object/observable behaviour. E.g. clock as time.

Source: Saldana (2016, pp.80-206)

Types of First Cycle Codings by Saldana (2016) Continued

Type of Codings (cd.)		Meaning
Affective	Emotion cd.	Feeling, mood, ability to read non-verbal cues. Insights into participants' perspectives, worldviews and life conditions. Could track emotional journey.
	Values cd.	Reflect participant's values (V), attitudes (A), beliefs (B), principles/moral codes, norms, representing their perspectives or worldview.
	Versus cd.	Identifies in dichotomous or binary terms, capture power issues or reveal injustice. Example: impossible vs realistic, market vs government plans
	Evaluation cd.	For judgements on policy or program, improve effectiveness or inform decisions. Categorise into positive & negative judgements, recommendation.
Literary & language	Dramaturgical cd.	Categorise them by: objectives, conflicts, actor strategies, actor attitudes, emotions, subtext (unspoken thoughts).
	Motif cd.	To classify types and elements of folk tales, myths, legends, using number codes.
	Narrative cd.	Classify a story, for example: abstract, orientation, complicating action (what happened next), evaluation, result, ending
	Verbal exchange cd.	Verbatim transcripts analysis and interpretation of the types of conversation and personal meanings of key moments in the exchanges.
Exploratory	Holistic cd	Macro-level coding, as lumper
	Provisional cd.	Predetermined start list of codes prior to fieldwork. From literature review, conceptual framework, research questions, previous research findings, pilot study fieldwork, hypotheses or hunches, etc.
	Hypothesis cd.	The researcher's prediction to the answers or response from respondents in categories. More categories can be established if the data has unique and important new response.
Procedural	Protocol cd.	A priori condings, for example the code is 'causes' of a phenomena, then the subcodes will be the reasons why.
	Outline of Cultural Materials cd.	Using indexing system for ethnographic studies (cultural and cross-cultural), studies of artifacts, folk art and human production.
	Domain and Taxonomic cd.	For discovering cultural knowledge and make taxonomy. A tree diagram is useful to show the results.
	Causation cd.	To identify causal explanations. The dimensions could be: internal/external, stable/unstable, global/specific, personal/universal, controllable/uncontrollable.

Source: Saldana (2016)

Specifically for NVIVO 11, it supports 4 main activities as follows (Bazeley and Jackson 2013, p.3). First is to manage data, which means to organise records, raw data files which includes interviews transcripts and published news and research, images, diagrams, web pages, etc. This applies also to rough notes and ideas jotted into memos. Second is to manage ideas, which means to organise and enables fast access to conceptual and theoretical knowledge generated in the course of the study and the data that support it. Which is also done iteratively between literature and data evidences. Third is to query data, which means to create queries, matrix, filters or ask questions within the data. Fourth is to visualise and report data, which is to support creating visualisation which shows content, structure, cases, ideas, concepts, sampling strategies, timelines, relationships, etc.

However, there are disadvantages of QDAS that researchers need to be aware of as follows (Bazeley and Jackson 2013, p.7). Computers could create distance between researcher and their data, hence, analysis still needs their full attention because computers are just tools. 'Code-and-retrieve' methods could be dominating, while there are other types of analytic activities. The use of QDAS could threatened analysis by making it more 'mechanised' and a tendency to becoming a more positivist approach. Lastly, misperceptiton that QDAS is an analysis by itself. The author recognises that QDAS might mechanise analysis and create dependency on quantification of data sources and references. To overcome that, the author wrote memos and tried to report findings in a narration or story.

3.2.3 Reliability and Validity in Qualitative Data Analysis

As a qualitative study, this interview data analysis also needs to consider its reliability and validity. It is an important aspect to ensure trustworthiness, rigor and quality (Golafshani 2003). It can be achieved by eliminating bias and increasing truthfulness of a proposition with triangulation, which is combining different ways of looking at the issue (Denzin 1978 in Golafshani 2003; Silverman 2010, p.276-278). According to Yin (2009), triangulation is the rationale for using more than one sources of evidence or data, which is also the strength of case studies. The implication of having multiple sources is the use of multiple measures and method to analyse the phenomena, hence it can strengthen reduce problems of construct validity (Yin 2009).

There are four types of triangulation which are data triangulation, investigator triangulation, theory triangulation and methodological triangulation (Patton 2002 in Yin 2009, p.116). Triangulation in this research are data, methodological and investigator triangulation. First, data triangulation was conducted by combining and comparing the different data sources such as

existing relevant literature, the 13 preliminary interviews, grey literature, interview results and other government /company information through their website. Grey literature (e.g. UNCTAD reports, World Bank reports, Port Company reports, etc.) and other relevant documents are not treated the same as interview transcripts with coding. However, relevant and critical information are added in memos as consideration and to bring a more in-depth analysis. Secondly, methodological triangulation is conducted since survey questionnaires is used in the next phase with more stakeholders. Lastly, investigator triangulation is conducted in the process itself since 7 different stakeholders are used as input for interview and survey. Figure 3.14 depicts the triangulation of this research.

Figure 3.14 Triangulation in this Research

Source: Author

Mentzer and Flint (1997) explained issues to be considered to improve validity in logistics research as seen in Table 3.14. It consists of 4 components which are statistical conclusion validity, internal validity, construct validity and external validity. Furthermore, a rigourous qualitative study can be established with the use of propositions (Gioia et al. 2012). It enables researchers to develop emerging concepts into measurable constructs in qualitative findings.

Table 3.14 Validity in Logistics Research by Mentzer and Flint (1997)

Statistical Conclusion Validity	Internal Validity	Construct Validity	External Validity
Is there a relationship among the constructs?	Is the relationship plausibly causal?	Given causal probability, what exactly are the constructs in the relationship?	Given causal probability between these specific constructs, how generalisable is it across persons, settings, and times?
Sensitivity to covariation, strong evidence of covariation	Rival hypothesis: history, maturation, instrumentation, selection	Nomological validity, content validity, trait validity (convergent, discriminant, reliability)	Statistical generalisability, conceptual replicability, realism

Source: Mentzer and Flint (1997, p.201)

3.2.4 Interview Respondents' Profile

Qualitative interviews were conducted with a total of 46 respondents from 41 companies or institutions, representing 7 types of stakeholders. These seven stakeholders are previously identified in literature (see Section 2.3.1) and results of preliminary interviews (see Appendix 2). The interview respondents are chosen through the author's professional network and their profile is described in Table 3.15. The technique for sampling was non-probability sampling (see Section 3.1.6).

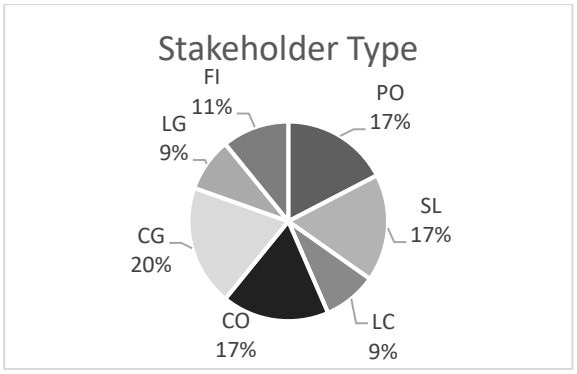
As seen in Table 4.13, respondents are chosen by judgement sampling and quota sampling to be able to represent the different types of stakeholders in this research. Not only by stakeholder type, company types are also determined to be able to represent national and transnational companies in the business. The total number of respondents are more than the number of companies/institutions because there are four companies/institutions that are represented by two or three respondents. This is intended as triangulation to make sure respondents in one company/institution are consistent. According to gender, there were 7 females (15.21%) compared to 39 male respondents. However, gender was not an issue in the thesis.

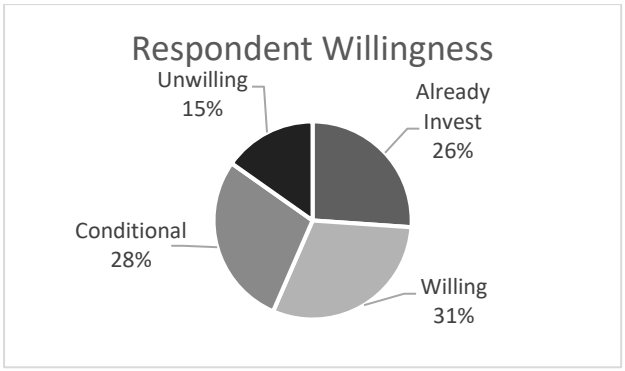
Table 3.15 Background Information of Interview Respondents

Stakeholder	Company /Institution	Respondents	% of Transnational Companies	Average Time of Interview
• Port Operator	8	8	50 %	51.12 minutes
• Shipping Lines	7	8	50 %	53.75 minutes
• Cargo Owner	8	8	50 %	49.12 minutes
• Logistics Companies	4	4	50 %	51.00 minutes
• Central Government	6	9	n.a	53.44 minutes
• Local Government	4	4	n.a	41.75 minutes
• Financial institutions	4	5	80 %	52.80 minutes
Total	**41**	**46**		

Source: Author

Respondents who were cargo owners were also selected to represent different types of cargoes. Their cargoes are: liquid bulk (oil and gas, palm oil), manufacturing (automotive, electronic goods), construction, fruit product and fast-moving consumer goods (2 companies of the world's top FMCG). No identifier of respondents' company background was questioned for ethical reasons. Detailed respondent profiles are shown in Table 3.16. Their willingness to invest are based on their response for the confirmation question, which will be explained further in Chapter 6. Proportion of stakeholder types, years of experience and respondent willingness are shown in Figure 3.15 and Figure 3.16.





Source: Author

Figure 3.15 Pie Chart Percentage of Stakeholder Types and Respondent Willingness

Source: Author

Figure 3.16 Pie Chart Percentage of Years of Experience

Table 3.16 Detailed Respondents' Background

Respon -dents	Position in Company/Institute	Stakeholder Type	Work Experience*	Interview Time**	Willingness to Invest
CG_1	Expert Staff	Central Government	>25	62	Willing
CG_2	Development Manager	Central Government	5-10	66	Unwilling
CG_3	Expert Staff	Central Government	>25	70	Already Invest
CG_4	Head of Section	Central Government	5-10	31	Conditional
CG_5	Director	Central Government	16-20	33	Unwilling
CG_6	Director	Central Government	21-25	63	Already Invest
CG_7	Deputy Director	Central Government	11-15	61	Willing
CG_8	Deputy Minister	Central Government	>25	49	Willing
CG_9	Director	Central Government	21-25	46	Willing
CO_1	Supply Chain Director	Cargo Owner	21-25	58	Willing
CO_2	Logistics General Manager	Cargo Owner	21-25	78	Conditional

*) in range of years to conceal respondents' identity, **) in minutes, Source: Author

Detailed Respondents' Background (continued)

Respon -dents	Position in Company/Institute	Stakeholder Type	Work Experience*	Interview Time**	Willingness to Invest
CO_3	Development Manager	Cargo Owner	21-25	50	Conditional
CO_4	Human Resource Director	Cargo Owner	5-10	36	Willing
CO_5	Marketing Manager	Cargo Owner	5-10	37	Willing
CO_6	External Affairs Manager	Cargo Owner	>25	47	Unwilling
CO_7	Logistics Manager	Cargo Owner	5-10	47	Unwilling
CO_8	Logistics Manager	Cargo Owner	5-10	40	Willing
FI_1	Deputy Director	Financial Institution	5-10	58	Willing
FI_2	Transport Specialist	Financial Institution	5-10	77	Conditional
FI_3	Transport Specialist	Financial Institution	5-10	46	Willing
FI_4	External Affairs Manager	Financial Institution	16-20	46	Willing
FI_5	Infrastructure Specialist	Financial Institution	16-20	37	Conditional
LC_1	Deputy Director	Logistics Company	11-15	50	Unwilling
LC_2	Logistics Manager	Logistics Company	21-25	57	Willing
LC_3	Expert	Logistics Company	21-25	68	Conditional
LC_4	Marketing & Ops Supervisor	Logistics Company	5-10	29	Willing
LG_1	Head of Transport Department	Local Government	>25	40	Already Invest
LG_2	Expert	Local Government	>25	24	Conditional
LG_3	Head of Branch	Local Government	16-20	54	Conditional
LG_4	Head of Branch	Local Government	>25	49	Already Invest
PO_1	President Director	Port Operator	21-25	58	Unwilling
PO_2	Senior Manager Engineering	Port Operator	16-20	71	Conditional
PO_3	Senior Manager Planning	Port Operator	16-20	61	Already Invest
PO_4	Commercial Director	Port Operator	16-20	53	Conditional
PO_5	Head of Section	Port Operator	11-15	28	Already Invest
PO_6	Commercial Director	Port Operator	11-15	45	Unwilling
PO_7	Senior Manager Planning	Port Operator	16-20	33	Already Invest
PO_8	Regional Director	Port Operator	>25	60	Conditional
SL_1	Country Manager	Shipping Lines	21-25	61	Already Invest
SL_2	Regional Manager	Shipping Lines	16-20	63	Already Invest
SL_3	Business Development Director	Shipping Lines	11-15	35	Conditional
SL_4	Commercial Director	Shipping Lines	21-25	93	Already Invest
SL_5	Regional Director	Shipping Lines	16-20	47	Already Invest
SL_6	Director	Shipping Lines	21-25	32	Conditional
SL_7	Operations Director	Shipping Lines	21-25	43	Already Invest
SL_8	Regional Director	Shipping Lines	>25	56	Willing

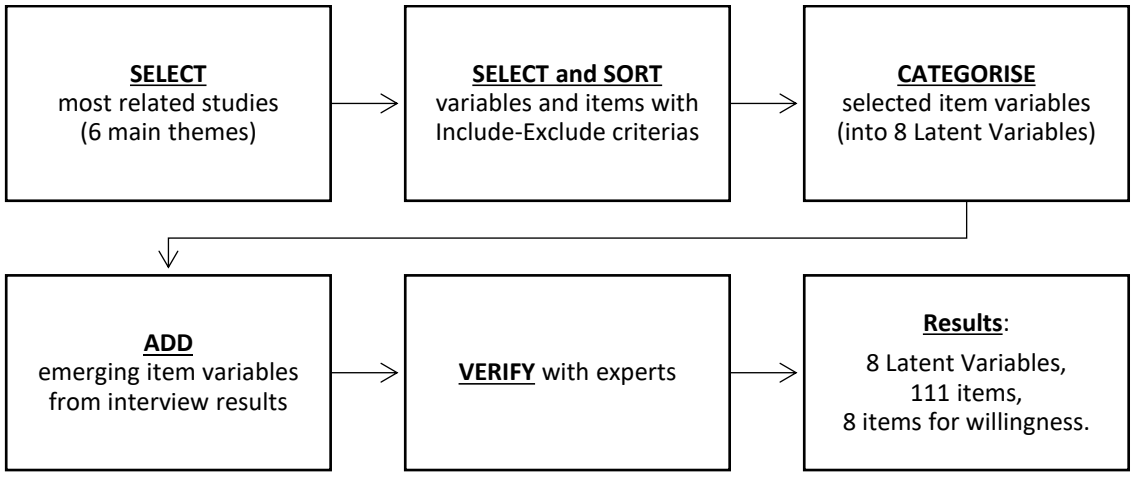
*) in range of years to conceal respondents' identity, **) in minutes, Source: Author

3.3 Quantitative Phase Research Process

This section explains the research process in the quantitative phase. It consists of survey questionnaire development, survey process, data preparation, Exploratory Factor Analysis, and reliability – validity in quantitative data analysis.

3.3.1 Development of Survey Questionnaire

The steps for developing the survey questionnaire in this Thesis is shown Figure 3.17.



Source: Author

Figure 3.17 Flow Diagram on the Development of Survey Questionnaire

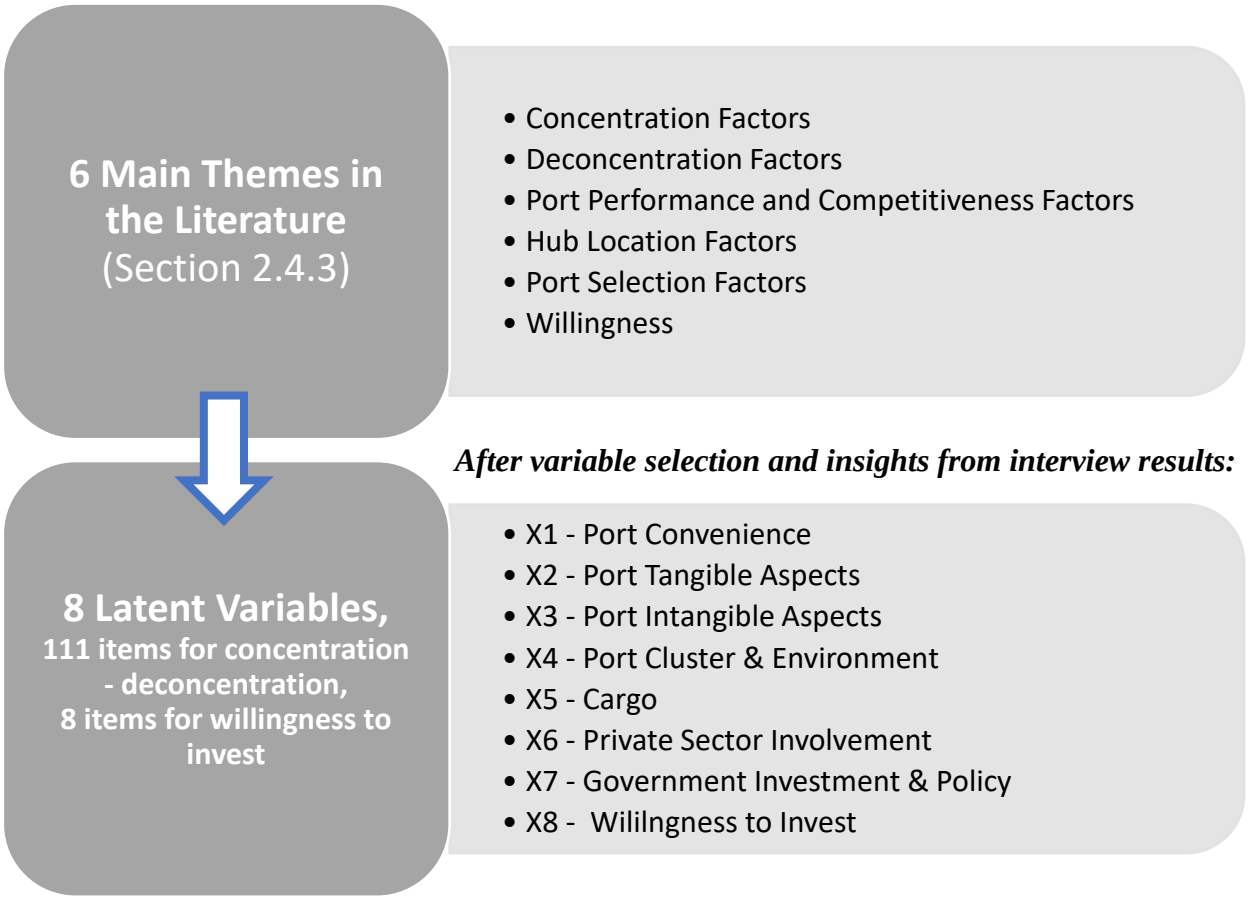
First, the most related studies or journal articles are selected (explained in Section 2.4.3). Variables from these studies, 6 main themes in literature from approximately 152 articles, are used as the input. These variables were selected and sorted by making sense of them, asking **"to become a hub, a peripheral port needs to have….?"** Variables which did not make sense, did not fit as the answer and unclear in the Thesis' context were excluded. There were four main reasons for exclusion: 1- because it is irrelevant or unclear; 2- because it is too much detailed to be considered; 3- because it is the definition and characteristics of peripheral port in the first place; 4- because the variable will be decided after the peripheral port becomes a hub or in future research. The list of excluded variables, and its reasons are described in Appendix 3 Table 4.

Meanwhile, variables were included if it made sense to be needed by a "peripheral-hub port". The included variables are aligned with the objective of this research which is to identify for a peripheral port to reduce its peripherality by becoming a hub. Hence, all included variables are considered "needed" for the peripheral port to become a hub, to create deconcentration from existing hub ports.

After qualitative interview was conducted and analysed, variables were categorised into 8 sets of latent variables. Emerging item variables from interview results were also added here, as shown in Figure 1.5 in Chapter 1. Emerging item variables represents the qualitative codings identified from interview transcripts. They are added into the relevant latent variables. Afterwards, the list of variables is verified with experts to prevent redundancy and to make sure the items are representing the appropriate latent variables. This resulted in 8 latent variables (X1

to X8), 66 item variables on concentration-deconcentration and 8 items on willingness to invest. The latent variable X1 to X7 are related port concentration – deconcentration, which will be analysed in Exploratory Factor Analysis and discussed in Chapter 5. Moreover, latent variable X8 is related to measure willingness to invest, which will be discussed in Chapter 6.

The main question in the survey for respondents to answer is made similar to the question used during variable selection: **"to become a hub, a peripheral port needs to have….?"** The transformation from variables in literature into variables as survey questionnaire are shown in Figure 3.18.



Source: Author

Figure 3.18 Emerging Themes from Main Interviews as Latent Variables

Latent Variables and Item Variables

All the item variables for each latent variable are detailed in Table 3.17 to Table 3.22.

Table 3.17 List of Item Variables and its Literature Sources for X1 and X2

Code	Item Variables	Sources
X1	**Port Convenience**	
X1.1	Shortest inland distance from the sea	(Murphy et al. 1992; Yurimoto and Masui 1995; Murphy and Daley 1997; Tiwari et al. 2003; Lirn et al. 2004; Malchow and Kanafani 2004; Blonigen and Wilson 2006; Alonso and Soriano 2009; Notteboom 2009b; Feng et al. 2012; Yuen et al. 2012; Fraser and Notteboom 2014)
X1.2	Less competition for port	(Tiwari et al. 2003; Baird 2006; Chang et al. 2008; Ducruet et al. 2009a; Lee and Kim 2009; Notteboom 2009b; Wang et al. 2012; Wang and Cullinane 2014; Fraser et al. 2016; Pham et al. 2016)
X1.3	Available sea routes	(Nir et al. 2003; Guy and Urli 2006; Notteboom 2009b; Notteboom 2010; Ducruet and Notteboom 2012a; Ducruet and Zaidi 2012; Feng et al. 2012; Martinez-Lopez et al. 2015; Yang et al. 2016)
X1.4	Low congestion	(Notteboom 1997; Wang 1998; Lee et al. 2008; Wiegmans et al. 2008; Yeo et al. 2008; Feng et al. 2012; Bae et al. 2013; Gohomene et al. 2016)
X1.5	Various cargo handling services, multipurpose	(Murphy et al. 1992; Murphy and Daley 1997; Mangan et al. 2002; Tongzon and Heng 2005b; Chang et al. 2008; Gohomene et al. 2016)
X1.6	Customs integration	(Yang and Chen 2016)
X1.7	Natural depth	(Baird 2006; Yuen et al. 2012)
X1.8	Safety and security	(Lirn et al. 2004; Ducruet and Notteboom 2012b; Feng et al. 2012; Gohomene et al. 2016)
X1.9	Short sea distance to main routes	(Notteboom 1997; Zohil and Prijon 1999; Lirn et al. 2004; Notteboom 2005; Baird 2006; Blonigen and Wilson 2006; Mangan et al. 2008; Ducruet and Notteboom 2012b; Fraser et al. 2016; Gohomene et al. 2016)
X1.10	Short sea distance to feeder ports	(Lirn et al. 2004; Baird 2006; Ducruet and Notteboom 2012b)
X1.11	Further away sea distance to other hub ports	(Lirn et al. 2004; Gohomene et al. 2016)
X1.12	Port's reputation	(Pando et al. 2005; Tongzon and Heng 2005a; Chang et al. 2008; Lee and Ducruet 2009; Notteboom 2009b; Ducruet and Notteboom 2012b; Kim 2014; Yang and Chen 2016; Notteboom et al. 2017)
*X1.13**	*Less competition with other modes of transport*	*Interview results*
*X1.14**	*Less competition for shipping*	*Interview results*
X2	**Port Tangible Aspects**	
X2.1	Depth of port channel and basin	(Tiwari et al. 2003; Notteboom and Rodrigue 2005; Tongzon and Heng 2005a; Ducruet 2006; Guy and Urli 2006; Chang et al. 2008; McCalla 2008; Wiegmans et al. 2008; Yeo et al. 2008; Tang et al. 2011; Ducruet and Notteboom 2012b; Feng et al. 2012; Kim 2014; Gohomene et al. 2016; Notteboom et al. 2017)
X2.2	Quay or berth length	(Tiwari et al. 2003; Malchow and Kanafani 2004; Song and Yeo 2004; Guy and Urli 2006; Chang et al. 2008; Yeo et al. 2008)
X2.3	Cranes for loading-unloading	(Ha 2003; Tiwari et al. 2003; Guy and Urli 2006)
X2.4	Container stacking yard	(Ducruet 2006)
X2.5	Availability of other handling equipment	(Murphy et al. 1992; Murphy and Daley 1997; Nir et al. 2003; Lirn et al. 2004; Ugboma et al. 2006; Tongzon and Sawant 2007; Tongzon 2009; Kim 2014; Gohomene et al. 2016)
X2.6	Reliability of other handling equipment	(Murphy et al. 1992; Murphy and Daley 1997; Yuen et al. 2012)
X2.7	Storage space, warehouse, liquid bulk tank	(Yuen et al. 2012)
X2.8	Overall port capacity	(Nazemzadeh and Vanelslander 2015; Yang et al. 2016; Notteboom et al. 2017)
X2.9	Standardised port infrastructure	(Lirn et al. 2004; Mangan et al. 2008; Ducruet and Notteboom 2012b; Feng et al. 2012)
*X2.10**	*Continuous infrastructure upgrade*	*Interview results*

Source: compiled by Author

Table 3.18 List of Item Variables and its Literature Sources for X3

Code	Item Variables	Sources
X3	**Port Intangible Aspects**	
X3.1	Overall port efficiency	(Yurimoto and Masui 1995; Notteboom 1997; UNESCAP 2002; Ha 2003; Nir et al. 2003; Lirn et al. 2004; Tongzon and Heng 2005b; Blonigen and Wilson 2006; Guy and Urli 2006; Ugboma et al. 2006; McCalla 2008; Wiegmans et al. 2008; Yeo et al. 2008; Tongzon 2009; Notteboom 2010; Tang et al. 2011; Wilmsmeier and Notteboom 2011; Ducruet and Notteboom 2012b; Bae et al. 2013; Kim 2014; Notteboom et al. 2014; Nazemzadeh and Vanelslander 2015; Van Dyck 2015; Suarez-Aleman et al. 2016; Yang and Chen 2016; Notteboom et al. 2017)
X3.2	Cargo handling efficiency	(Ducruet 2006; Feng et al. 2012; Yuen et al. 2012; Gohomene et al. 2016)
X3.3	Low cargo damage	(Murphy et al. 1992; Murphy and Daley 1997; Ducruet 2006; Ugboma et al. 2006; Tongzon 2009; Yuen et al. 2012; Gohomene et al. 2016)
X3.4	Incentives and promotions	(Yurimoto and Masui 1995; Kim 2014; Monios and Wang 2014)
X3.5	Logistics services (warehousing, freight forwarding, LCL handling, etc.)	(UNESCAP 2002; Notteboom 2005; Notteboom and Rodrigue 2005; Pettit and Beresford 2009; Ducruet and Notteboom 2012b; Feng et al. 2012; Monios and Wilmsmeier 2012; Woo et al. 2013; Wilmsmeier et al. 2014; Notteboom et al. 2017)
X3.6	Transhipment service (consolidate cargo from different origins to be sent to different destinations)	(UNESCAP 2002; Notteboom and Rodrigue 2005; Lee and Ducruet 2009; Tongzon 2009; Ducruet and Notteboom 2012a; Monios and Wilmsmeier 2012; Wilmsmeier and Monios 2013; Woo et al. 2013)
X3.7	IT ability (information and communication)	(Murphy et al. 1992; Murphy and Daley 1997; Ha 2003; Song and Yeo 2004; Chang et al. 2008; Yeo et al. 2008; Yuen et al. 2012; Woo et al. 2013; Kim 2014)
X3.8	Stability of port's labour	(Yeo et al. 2008)
X3.9	Standard quality of port management	(Ha 2003; Lirn et al. 2004; Pando et al. 2005; McCalla 2008; Yeo et al. 2008; Notteboom 2009b; Rodrigue and Notteboom 2010; Ducruet and Notteboom 2012b; Feng et al. 2012)
X3.10	Good management and labour relations	(Chang et al. 2008; Wiegmans et al. 2008)
X3.11	24/7 service	(Yurimoto and Masui 1995; Yeo et al. 2008)
X3.12	Communicative and responsive	(Ugboma et al. 2006; Chang et al. 2008; Yeo et al. 2008; Tongzon 2009; Yuen et al. 2012; Kim 2014; Gohomene et al. 2016)
X3.13	Cargo tracking system	(Fraser and Notteboom 2014)
*X3.14**	*Overall quality of human resource*	*Interview results*
*X3.15**	*Financially profitable*	*Interview results*
*X3.16**	*Developing/initiating containerisation facilities*	*Interview results*
*X3.17**	*Other value added services (water, rubbish, bunkering, etc.)*	*Interview results*

Source: compiled by Author

Table 3.19 List of Item Variables and its Literature Sources for X4

Code	Item Variables	Sources
X4	**Port Cluster and Environment**	
X4.1	Public road connecting surrounding cities to the port	(Guy and Urli 2006; Chang et al. 2008; McCalla 2008; Wiegmans et al. 2008; Yeo et al. 2008; Ducruet and Notteboom 2012b; Fraser and Notteboom 2014; Nazemzadeh and Vanelslander 2015; Yang et al. 2016; Notteboom et al. 2017)
X4.2	Toll road connecting the port	(Yurimoto and Masui 1995; Lirn et al. 2004; Ducruet 2006)
X4.3	Railways connecting the port	(Yurimoto and Masui 1995; Lirn et al. 2004; Ducruet 2006; Fraser and Notteboom 2014)
X4.4	Waterway/river connecting the port	(Lirn et al. 2004; Fraser and Notteboom 2014)
X4.5	Intermodal transport links	(Hilling 1977; Hayuth 1981; Slack 1985, 1990; Mangan et al. 2002; Lirn et al. 2004; Tongzon and Heng 2005a; Guy and Urli 2006; Notteboom and Rodrigue 2007; Yeo et al. 2008; Pettit and Beresford 2009; Tang et al. 2011; Ducruet and Notteboom 2012b; Feng et al. 2012; Woo et al. 2013; Fraser and Notteboom 2014; Kim 2014; Martinez-Lopez et al. 2015; Yang and Chen 2016)
X4.6	Available land for port and logistics expansion	(Ogundana 1971; Hayuth 1981, 1982; Barke 1986; Notteboom and Rodrigue 2005; McCalla 2008; Yang and Chen 2016)
X4.7	Relatively cheap land	(Yang and Chen 2016)
X4.8	Certain population size in metropolitan area near the port	(Ducruet 2006; Lee et al. 2008; Wiegmans et al. 2008)
X4.9	Certain size of metropolitan area near the port	(Kenyon 1970; Ogundana 1971; Hoyle 1999; Brunt 2000; Ducruet 2006, 2008)
X4.10	International forwarding agents	(Ducruet 2006)
X4.11	Relatively cheap labour cost	(Yurimoto and Masui 1995; Wang 1998; Slack and Wang 2002; Notteboom and Rodrigue 2005; Lee and Rodrigue 2006; McCalla 2008; Yang and Chen 2016)
X4.12	Load centres for inland cargo consolidation	(Hilling 1977; Hayuth 1981, 1982; Slack 1985, 1990; Notteboom 2005; Notteboom and Rodrigue 2007; Pettit and Beresford 2009; Monios and Wilmsmeier 2012)
X4.13	Public road access to load centres from port	(Notteboom and Rodrigue 2007; Fraser and Notteboom 2014)
X4.14	Special Economic Zones	(Notteboom and Rodrigue 2005; Tongzon and Heng 2005a; Yeo et al. 2008)
X4.15	Sufficient hinterland (hinterland is the area served by the port)	(Yurimoto and Masui 1995; Pando et al. 2005; Mangan et al. 2008; Yuen et al. 2012; Parola et al. 2013)
X4.16	Market power, economic activity of hinterland	(Kenyon 1970; Charlier 1988; Yurimoto and Masui 1995; Lee and Ducruet 2009; Notteboom 2009b; Notteboom 2010; Feng and Notteboom 2013; Parola et al. 2013; Xu et al. 2015; Yang et al. 2016)
X4.17	Overlapping hinterland	(Hoare 1986; Airriess 1989; Notteboom and Rodrigue 2007; Lee and Ducruet 2009; Lemarchand and Joly 2009; Rodrigue and Notteboom 2010; Laxe et al. 2012; Wilmsmeier and Monios 2013)
X4.18	Expansion of foreland (foreland is the land area as destination served by the port)	(Lee and Ducruet 2009; Rodrigue and Notteboom 2010; Laxe et al. 2012; Wilmsmeier and Monios 2013)
*X4.19**	*Existing basic infrastructure (electricity, water, road, etc.)*	*Interview results*
*X4.20**	*New local market*	*Interview results*
*X4.21**	*Fertility of local land*	*Interview results*
*X4.22**	*Near tourism sites*	*Interview results*
*X4.23**	*New industrial sites*	*Interview results*

Source: compiled by Author

Table 3.20 List of Item Variables and its Literature Sources for X5 and X6

X5	**Cargo**	
X5.1	Overall cargo volume	(Tiwari et al. 2003; Song and Yeo 2004; Ducruet 2006; Tongzon and Sawant 2007; Yeo et al. 2008; Tang et al. 2011; Gohomene et al. 2016; Yang and Chen 2016; Notteboom et al. 2017)
X5.2	Transhipment cargo volume (consolidated cargo from different origins to be sent to different destinations)	(Chang et al. 2008; Yang and Chen 2016)
X5.3	Container cargo volume	(Zohil and Prijon 1999; Tiwari et al. 2003; Pando et al. 2005)
X5.4	Local cargo volume	(Chang et al. 2008)
X5.5	Increasing need for container transhipment	(McCalla 2008; Notteboom 2010; Wang and Ng 2011; Wilmsmeier and Notteboom 2011; Monios and Wilmsmeier 2012; Wilmsmeier and Monios 2013; Notteboom et al. 2014; Wilmsmeier et al. 2014; Van Dyck 2015)
X5.6	Niche market, specialised cargo volume	(Charlier 1988; Pando et al. 2005; Chang et al. 2008)
X5.7	Economies of scale from increased cargo throughput	(Hayuth 1981; Notteboom 1997; Wang 1998; Monios and Wang 2014)
X5.8	High value cargo	(Chang et al. 2008)
X5.9	Low value cargo	(Chang et al. 2008)
*X5.10**	*Mapping of cargo*	*Interview results*
*X5.11**	*Availability of natural resource cargo*	*Interview results*
*X5.12**	*Availability of raw material cargo for industry/manufacturing*	*Interview results*
*X5.13**	*Export cargo on continuous basis*	*Interview results*
X6	**Private sector involvement**	
X6.1	Private sector involvement in operations (concession, leasehold, Build Operate Transfer, etc.)	(Parola et al. 2013; Yang et al. 2016)
X6.2	Sound investment system	(Wilmsmeier et al. 2014; Yang and Chen 2016)
X6.3	Financial assistance for investing companies	(Yang and Chen 2016)
X6.4	Exclusive contracts policy for dedicated terminal	(Lirn et al. 2004)
X6.5	Concentration of investment	(Todd 1993; Hoyle and Charlier 1995; Ducruet et al. 2009b; Wang and Ducruet 2012, 2013; Van Dyck 2015)
X6.6	Strategy of international port operators	(Hoyle 1999; Slack and Wang 2002; Notteboom and Rodrigue 2005; Notteboom 2006a; Notteboom 2009b; Parola et al. 2013; Fraser et al. 2016)
X6.7	Strong relations between port/port authority and shipping	(Slack and Wang 2002; Wilmsmeier and Notteboom 2011; Wilmsmeier et al. 2014)
X6.8	Private sector involvement in port ownership/port devolution	(Oral et al. 2007; Ducruet et al. 2009b; Shinohara 2009; Parola et al. 2013; Wilmsmeier et al. 2014)
X6.9	Shipping involvement in terminal	(Notteboom and Rodrigue 2005; Notteboom 2009a; Ducruet and Notteboom 2012a; Fraser et al. 2016; Notteboom et al. 2017)
X6.10	Shipping alliance formation	(Notteboom 2009a; Ducruet and Notteboom 2012a; Notteboom et al. 2017)
*X6.11**	*Not over investing*	*Interview results*
*X6.12**	*Local entrepreneurship*	*Interview results*
*X6.13**	*Collaboration with local industries*	*Interview results*
*X6.14**	*Collaboration with shipping lines*	*Interview results*
*X6.15**	*Clear phases of investment (time and amount of investments)*	*Interview results*
*X6.16**	*Involve in Corporate Social Responsibility (CSR) programmes*	*Interview results*
*X6.17**	*Incentives for first local partners*	*Interview results*
*X6.18**	*Less monopoly*	*Interview results*
*X6.19**	*Private sector involvement in National Planning*	*Interview results*

Source: compiled by Author

Table 3.21 List of Item Variables and its Literature Sources for X7

Code	Item Variables	Sources
X7	**Government Investment & Policy**	
X7.1	Government policy to prioritise peripheral ports	(Rodrigue and Notteboom 2010; Yuen et al. 2012; Parola et al. 2013)
X7.2	Supported by national planning for port and logistics	(Todd 1993; Brunt 2000; Ducruet 2008; Ducruet et al. 2009b; Lemarchand and Joly 2009; Shinohara 2009; Feng et al. 2012; Parola et al. 2013; Wilmsmeier et al. 2014; Wilmsmeier and Monios 2016)
X7.3	Supported by local and provincial government planning	(Fraser and Notteboom 2014)
X7.4	Political stability	(Yurimoto and Masui 1995; Wang and Ducruet 2012, 2013; Van Dyck 2015; Gohomene et al. 2016; Yang and Chen 2016)
X7.5	Supported by customs regulation	(Chang et al. 2008; Yuen et al. 2012; Gohomene et al. 2016; Yang and Chen 2016)
X7.6	Supported by export import and international trade policy	(Hoyle and Charlier 1995; Yang and Chen 2016)
X7.7	Tax cut/ exemption	(Yang and Chen 2016)
X7.8	Efficient local and provincial government administration	(Parola et al. 2013; Yang and Chen 2016)
*X7.9**	*Active interface between Port Authority (regulator) and port operator*	*Interview results*
*X7.10**	*Local and provincial government initiative*	*Interview results*
*X7.11**	*Aligned with cabotage law/ protectionism*	*Interview results*
*X7.12**	*Specific policy (e.g. fishing moratorium, archipelagic sea lanes)*	*Interview results*
*X7.13**	*Less bureaucracy*	*Interview results*
*X7.14**	*Central Government initiatives (e.g. subsidy)*	*Interview results*
*X7.15**	*Central government coordination with local/provincial government and private sector*	*Interview results*

Source: compiled by Author

Table 3.22 List of Item Variables and its Literature Sources for X8 (Willingness to Invest)

Code	Item Variables	Sources
X8	**Willinness to Invest**	
X8.1	We get twofold transit cost advantage	(Guy and Urli 2006)
X8.2	We get twofold port service advantage	(Guy and Urli 2006)
X8.3	We get twofold transit and port service advantage	(Guy and Urli 2006)
X8.4	We get a dedicated terminal	*Interview results*
X8.5	We get twofold storage cost advantage	*Interview results*
X8.6	We can contribute to economic growth in ther region	*Interview results*
X8.7	We can become the first to dominate the business/market in that area/region	*Interview results*
*X8.8**	Others (fill in the blank)	*Additional open question*

Souce: compiled by Author

Survey Questionnaire Layout

Overall, the survey consisted of 3 main parts, described in Table 3.23. A live screen-shot of the survey is attached in Appendix 4. First is the Preface. Respondents were introduced to the purpose of the study, asked to respond according to their background, also reminded about the confidentiality of survey and ethical procedures. Then fill the consent page. If they declined, the survey would end. If they consented, they would continue to be asked about their background. These questions include: which type of stakeholder they are; how long they have been working in the company; how long they have been working in the field; in which province are they located; are their employer owned by the government, domestic or international private sector. Specifically, for cargo owners, they were asked what type of cargo their focus was. Lastly, they were given a scenario page which explained what a peripheral and hub port is and what is not. This was given as it has been considered after the main interview, where different stakeholders might have different meaning or definitions of peripheral and hub ports and to remind them not to be influenced by politics or institutional concerns.

Table 3.23 Survey Layout and Data Type as Output of the Survey

Main Parts of Survey	Content	Scale / Data Type	Statistical Tools
1-Preface	• Introduction & consent page	-	-
	• Respondent Profile questions	Categorical (nominal)	Descriptive analysis, T-test, ANOVA
	• Scenario Page	-	-
2-Perception Questions	• Likert questions for variable X1 to X7	Likert	Descriptive analysis, EFA, Multiple Regression
	• Determine 3 most important item for each variable	Categorical (nominal)	Descriptive analysis
	• Determine rank for variable X1 to X7	Categorical (ordinal)	Descriptive analysis
3-Willingness Questions	• Likert questions for variable Willingness	Likert	Descriptive analysis, EFA, Multiple Regression
End page	Thank you message	-	-

Source: Author

Second were the Perception Questions. They were asked in likert questions to measure importance of each items in variable X1 to X7. They were then asked to determine 3 most important items for each variable X1 to X7, which was not ranked. The purpose is to be able to cross check whether their higher score in likert answers are consistent with their 3 prioritised items. Next, they were asked to rank variable X1 to X7, with similar purpose to be able to cross check whether their higher score in likert answers are consistent with their rank among the 7 variables. Third were the Willingness Questions which also use likert to measure their

willingness. Lastly, the end page thanked the respondent and provided the author's email contact so respondents could request for research summary results after the study was completed. They were reminded that their email address and identifiers are kept confidential.

Types of Questions and Scale

Survey questions and scale needs to be aligned. A scale is a tool which enables participants to be distinguished how they differ from one another on the variables of the study (Sekaran 2003). There are four basic types of questions: nominal (categorical), ordinal (categorical with important orders), interval (able to conduct arithmetical operations) and ratio (interval with absolute zero point) (Sekaran 2003). Questions are set into the right type of data output that is needed. Hence, it is clear which data is used for which statistical tools and interpretation needed to answer the research questions.

The type of data from each part of the survey and related statistical tools to be used are also described in Table 4.25. Likert scale is a type of interval scale (Sekaran 2003, p.197), which is used to measure attitude (as explained in Section 4.4.1). A study by Chang et al. (2008) uses similar approach to this thesis, which is survey and Exploratory Factor Analysis, to identify important factors of port selection by global shipping lines. They used a likert scale of 1-as very unimportant to 5-as very important (Chang et al. 2008). Respondents were global shipping lines operating on main routes between East Asia - Europe and Trans-Pacific.

An Indonesian psychologist Widhiarso (2010), argued that providing a neutral category of response (e.g. a 5-scale or 7-scale) could add difficulties for respondents to reflect on their experience or behaviour in Indonesia. However, from his comprehensive literature review cited in Widhiarso (2010) shows that middle categories gives respondents discretion to respond neutrally in sensitive issues (Klopfer 1980; Presser and Schuman 1980; Kalto nand Schuman 1982), increase reliability and validity of the measurement (Cronbach 1950; Kulas et al 2008) and does not have significant effect on data quality (Aiken 1983; Andrews 1984; Kulas et al 2008). Hence, he recommends having a middle response category.

In this Thesis' survey, it was decided that a 7 point scale was to be used instead of 5 to provide greater sensitivity. Elmore and Beggs (1975 cited in Sekaran 2003, p.199) argued that a 5-point or 7-point scale is just as good, with increased points does not necessarily improve reliability of the ratings. The Likert scale to measure importance in this study are as follows: *1-not at all important; 2-low important; 3-slightly important; 4-neutral; 5-moderately important; 6-very important; 7-extremely important*. Meanwhile, to measure willingness are as follows: *1-very*

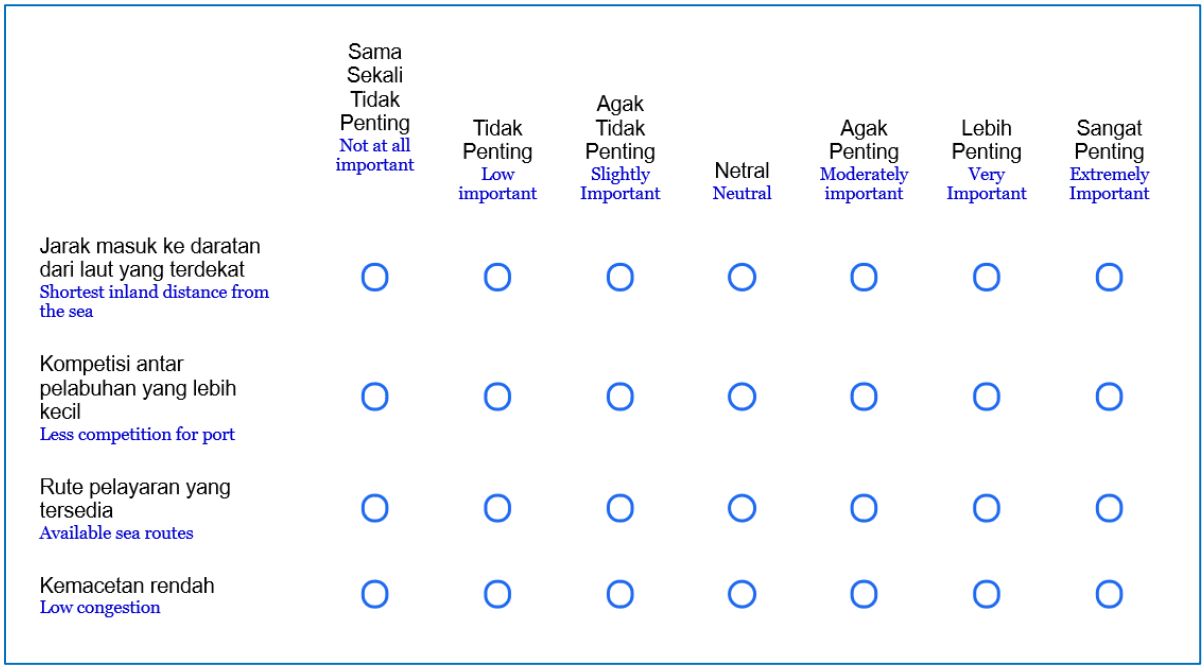
unwilling; 2-unwilling; 3-slightly unwilling; 4-neutral; 5-moderately willing; 6-very willing; 7-already investing.

Language Translation

The survey questionnaire was written in English then translated to Indonesian. Fink and Kosecoff (1998, p.37) provide guidelines for translating instruments. It is suggested that translations are conducted twice: first to translate from English by a native speaker; second to translate back to English by a fluent speaker. Afterwards, they collaborate to make both translations match (Fink and Kosecoff 1998). The survey questionnaire in this Thesis was translated by the author herself. The second stage of translation was supported by a colleague with an IELTS score of 8, with a background in marine engineering and works in the engineering department of a port operator company. Hence, the colleague is very much experienced with port and maritime transport terminologies in both languages.

Moreover, a pilot survey is also conducted. Hence, wording and translation issues were improved after pilot survey, before the main survey. In the end, both English and Indonesian language are presented in the survey questionnaire online to enable non-native respondents from international companies and institutions to answer them. English and Indonesian language are distinguished using different font size and colour, hence, it provides a convenience user interface in the online survey. An example of the user interface in the online survey is shown in Figure 3.19.

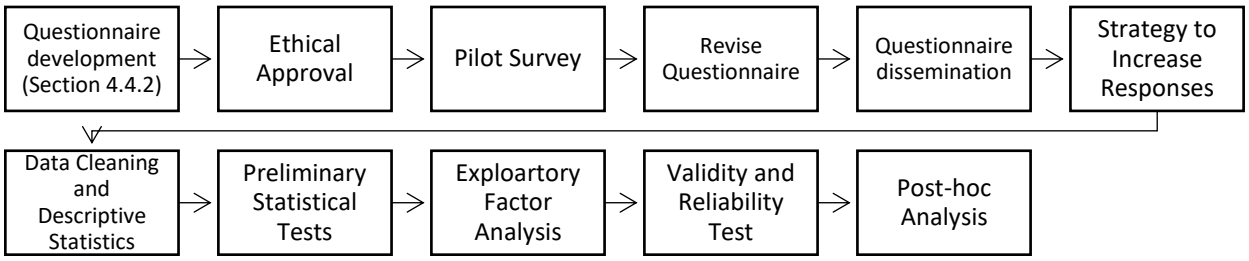
Figure 3.19 Example of User Interface in Online Survey



Source: Author

3.3.2 Survey Process

Figure 3.20 shows the survey process from questionnaire development up to quantitative data collection and analysis in this Thesis. After questionnaire development in the previous section, ethical approval was gained, then pilot survey and main survey was conducted. Strategies to increase responses were conducted during questionnaire dissemination.



Source: Author

Figure 3.20 Survey Process and Quantitative Data Analysis Flow Diagram

Pilot Survey

According to Fink and Kosecoff (1998, p.35), pilot testing in survey is critical to anticipate problems that might happen during the actual survey and make plans to overcome these problems. They provided guidelines for pilot testing as follows (Fink and Kosecoff 1998): Pilot survey tests the directions of a self-administered questionnaire, also the use of wordings in the questions; Respondents in the pilot survey should have similar background and characteristics as the actual respondents in the actual survey; The more item questions asked in the survey, the better to have more pilot survey respondents; Reliability of the survey could be tested by looking at the clarity of questions and general format of survey, while validity could be tested by making sure all relevant topics or themes are included; The survey should be able to measure and capture a range of responses, for example different feelings or behaviour.

After evaluation by Cardiff Business School Ethics Committee, the online survey received ethical approval and a pilot study was carried out over two weeks from in December 2018. There were 26 recorded responses, however, only 14 respondents completed until the end of the survey and provided their feedback or comments. Besides the 7 stakeholders type background, the rest came from other background such as consultancy and academician. Overall, the feedback implied that the online survey provider, Qualtrics, has given them a good experience on the effectiveness, simplicity and convenience of the online survey provider. Other feedback related to wordings. Corrections to the online survey were done accordingly, e.g. wording and

Indonesian translation, without any substantial changes. The average duration time to complete pilot survey was 29 minutes.

Main Survey

For the main survey, respondents' population are people working at Indonesia's maritime transport industry, while the sample are the customers of a port operator company (non-probability sampling explained in Section 3.1.6). The online survey was conducted over 3 weeks in January and February 2018. It was facilitated by Qualtrics (https://www.qualtrics.com). There are two ways in distributing the online survey, which are by professional/business messaging and by personal/private messaging. Professional messaging includes sending emails to respondents' company email addresses, gained from the author's sponsor company contacts. Since the sponsor company is located in the capital city of Jakarta and approximately handles 50% of cargoes coming in and out of the country (explained in Section 1.5.2), these contacts are an appropriate sample to represent Indonesia's maritime transport industry. Personal messaging includes sending to personal email addresses, *Whatsapp*, *Whatsapp Groups*, *Facebook* messaging, and *Yahoo Groups*. Contacts are gained from the author's personal contacts. Overall distribution of the survey link used anonymous link, and none used personal link, hence, potential respondents contacted were not able to be traced and tracked with their responses. Survey data is then imported from Qualtrics to MS. Excel for data cleaning, then to IBM SPSS 23. The number of potential respondents contacted is shown in Table 3.26.

Increasing Response Rate

Another aspect to be considered during the survey process was the strategy to increase response rates. Wallace (1954 cited in Miller and Salkind 2002, p.301) explained the disadvantages of having mail questionnaires is that it might have low response rate, hence, follow-up efforts are needed and non-response bias should be addressed. The survey conducted in this Thesis is similar to mail questionnaires because respondents had the right to ignore and not-respond to the survey link sent by email and personal message. Hence, follow-up emails and non-response bias test is conducted.

Despite those disadvantages, mail questionnaire has many advantages which is the reason why survey in this Thesis adapts mail questionnaire (electronic mail) compared to other strategies such as telephone survey or interview survey. Miller and Salkind (2002) explained these advantages of mail questionnaires as follows: It enables a wide coverage of respondents related to their geographic location; enables minimum expenditure for money and effort; could reach

respondents which are difficult to locate and interview; and gives respondents a sense of privacy. Moreover, they provide techniques to increase survey response rate as follows (Miller and Salkind 2002, p.305): having follow-up mail, having a sponsor who is known by respondents to support the survey dissemination process; having an acceptable length of questions; having an introductory letter and attractive, easy-to-complete form of survey; having objective types of questions; and providing incentives or payment for respondents. The optimal conditions for these techniques to work are described in Table 3.24.

Table 3.24 Techniques to Increase Survey Responses

Methods & Possible Increase*)		**Optimal Conditions**
Follow-up	50 %	More than one follow-up might be needed, or by using telephone call.
Sponsor	17 %	People the respondent knew produced the best results; A state headquarters received the second-best rate. Other sponsors could be a lower-status person in a similar field.
Length	22 %	The shorter the questionnaire is the better; length may cease to be a factor for a questionnaire more than 10 pages.
Introductory letter	7 %	An altruistic appeal has better results.
Type of questions	13 %	Questionnaires asking for objective information receive the best rate, while those asking for subjective information receive the worst.

Source: Miller and Salkind (2002 p.305 adapted from NCS Pearson (www.ncspearson.com), 2001), *) in % of Returns

Besides follow-up or reminder email, Dillman et al. (2009, p.364) p. 364 argued that good timing is critical to disseminate the online survey link. Good timing contributes to give respondents comfort when they are best able to answer. Couper and Peterson (2017) argued that respondents using mobile phone to fill in the survey takes longer completion time than those using computers because the difficulty to read in small device and increased mobility adds more distractions. Furthermore, Van Selm and Jankowski (2006) argued that mixed-method strategy using both electronic and pen-and-pencil questionnaires helps to reach respondents with no internet access. In this Thesis' survey, efforts to increase responses are: by having follow-up email up to 3 times; acceptable length of questions; providing introductory letter and attractive, easy-to-complete form of survey; good timing especially because the 7-hour time difference between UK and Indonesia; and enabling respondents to answer through mobile phones and computers.

3.3.3 Data Preparation

Procedures conducted for data preparation prior to Exploratory Factor Analysis (EFA) are calculating missing data, response rate, non-response bias, mapping respondent profile and descriptive statistics. It is summarised in Table 3.25 as follows.

Table 3.25 Procedures in Quantitative Data Analysis Prior Exploratory Factor Analysis (EFA)

No.	Procedures and Tests	Requirements	Results in this study	Interpretation
Data preparation				
1.	Missing data	Non-random missing data such as attrition at the end of the questionnaire is not acceptable (Hair et al. 2010, p.47).	After data cleaning, 171 responses are above 93% completion, with finished answers until variable X7. Shownw in Table 3.26.	There are no more missing data.
2.	Responses rate	Purposive (non-probability) sampling is to achieve representativeness from respondents (Teddlie and Tashakkori 2009, pp.173-175).	171 responses, which is 2.7% response rate shown in Table 3.26.	Since the purpose is not for generalisation, hence, convenience sampling and snowball sampling is acceptable.
3.	Respondent profile	To understand respondent's background.	Figures 3.21 to 3.24, and Table 3.27.	Dominantly respondents are from Cargo Owners.
	Non-Response Bias	Non-responses bias is detected by comparing early and late responses using T-test (Connors and Elliot 1994; Lindner et al. 2001).	T-tests shows a significance >0.05, meaning there are no differences.	Non-response bias is not an issue.
Descriptive Statistics				
2.	Descriptive Statistics for each item variables	Mean and Standard Deviation is used to describe each item variables in each latent variable.	In Section 6.2.1	Item variables with the highest mean are identified.
3.	Descriptive for Ranking Data for X1 to X7	Ordinal data, description in percentage.	In Section 6.2.1	Item variables with the highest mean are identified.

Source: Author

Missing Data

In total there were 288 responses. However, only 171 responses were completed 93% and above. The remaining 117 responses were partially completed, below 93% completion. The average time to complete is 28.6 minutes, which is not far from the 29 minutes average time of pilot survey. Missing data under 10% for each respondent can be ignored, however, non-random missing data such as attrition at the end of the questionnaire is not acceptable (Hair et al. 2010, p.47).

Within the 288 responses, missing data are not random because it occurs at the end of the survey meaning that respondents do not finish. Those who finish until likert questions variable X7 (to be used in Exploratory Factor Analysis) is mentioned by Qualtrics as having a 94% completion, which is the 171 respondents. Hence, only these are used for further analysis and the rest are deleted. A complete case approach is used and there is no more issue on missing data.

Response Rate

Within the 171 responses, respondents' data by type of stakeholder and percentage of completion is summarised in Table 3.26 as follows. Based on Table 3.26, it is seen that Cargo Owners are the most dominant stakeholder type in the survey. This is related with contacts given by author's sponsor, which roughly represents the proportion of cargo owners compared to proportion of Shipping Line and Logistics Companies. Potential respondents who were contacted to participate in this study are customers of a port operater company. Since the port company's headquarter is located in Tanjung Priok, Jakarta, and Tanjung Priok itself handles 50% of cargoes coming in and out of the country (explained in Section 1.5.2). Hence, non-probability sampling carried out is considered appropriate.

The highest response rate comes from Central Government, followed by Financial Institutions and Port Operators. Meanwhile, the lowest response rate and least participation comes from Local Government. They are the most difficult to access stakeholder, eventhough the author has sent personal messages to 280 contacts. There might be particular peripheral locations in Indonesia that has weaker, slower or poor internet coverage. As reported by Spilsbury (2014, p.28) that approximately 20% of Indonesians have internet accounts, other access use internet cafes and, increasingly, mobile smartphones. Other reason of their low participation might be because of their own perception of having low capability or lack of experience to the survey topic (MacKenzie and Podsakoff 2012).

Stakeholder type in the "Others" category filled in their background in the provided space. They can be categorised further as: 12 academicians, 6 lawyers, 12 unclear. These unclear respondents are actually one of the 7 stakeholders; however, they do not choose those previous choices because they might not be confident to identify themselves in the categories provided.

Table 3.26 Survey Response Rate

Stakeholder Type	Respondents Contacted			Response Received			Response Rate (%)^	Response Rate completion 93% and above ^^
	Profes-sional messaging	Personal messaging	Total	Under 93% completion	With completion 93% above	Total		
Port Operator (PO)	-	160	160	9	29	38	23.8	18.1
Shipping Line (SL)	536	70	606	26	26	52	8.6	4.3
Cargo Owners (CO)	4953	-	4953	44	49	93	1.9	1.0
Logistics Companies (LC)	659	-	659	9	26	35	5.3	3.9
Central Government (CG)	-	50	50	10	14	24	48.0	28.0
Local Government (LG)	-	280	280	3	3	6	2.1	1.1
Financial Institution (FI)	-	18	18	5	5	10	55.6	27.8
Others	-	-	-	11	19	30	-	-
TOTAL	**6148**	**578**	**6726**	**117**	**171**	**288**	4.2	2.5

^)Response rate(%) = Total response received / Total respondents contacted * 100%
^^)Response rate 93% and above (%) = Response received above 94% / Total respondents contacted * 100%
Source: Author

Various strategies for online survey dissemination discussed in Section 4.4.3 has been done to increase response rate such as having an introductory email with mentioning the research sponsor institution, sending follow-up emails up to three times and appropriate length of survey questions as suggested by Miller and Salkind (2002); making sure to send the survey link to relevant to target group as suggested by Van Selm and Jankowski (2006); and increasing mobility while answering by providing a mobile phone friendly survey as suggested by Couper and Peterson (2017). The use of more personalised messaging, reminder email and good timing when respondents are best able to answer is also carried out, as suggested by Dillman et al. (2009, pp.2-3, 360, 364). Respondents are sent email reminders and survey links by personal messaging mostly in the early morning before starting their work hours and after work hours before returning home, in Indonesian time.

Overall, response rate in this survey can be considered low compared to response rate of 30% - 40% in other marketing or education surveys (e.g. Van Selm and Jankowski 2006; Manfreda et al. 2008; Nulty 2008). A meta-analysis study on survey response rate by Manfreda et al. (2008) explains that on average web surveys yield an 11% lower response rate than other modes. However, other modes are more difficult in this case since respondents are spread across different islands of Indonesia and more time consuming, which has been explained in Section 3.1.6 on non-probability sampling. Purposive sampling and snowball sampling are found to be helpful in this survey. Data collected from snowball sampling enables the author to create new connections with respondents which are not in the author or sponsor company's contacts. Despite the low response rate of 4.2% (288 total respondents), specifically 2.5% (171 completed responses) as seen in Table 3.26, data from this survey is still accepted statistically to be processed in Exploratory Factor Analysis (EFA). Statistical test to support this are tests for sample adequacy explained in Section 3.3.4.

Respondent Profile

The demographic of respondents with completion 93% and above, which are a total of 171 respondents, are summarised in Table 3.27 and Figures 3.21 to 3.24. Basic information on respondents' background are as follows. Cargo Owners (29%) are the most dominant stakeholder, followed by Port Operators (17%) Shiping Line (15%) and Logistics Companies (15%). Hence, the most important stakeholders have been convered. The smaller portions of respondents are Local Government (2%), Financial Institutions (3%), Central Government (8%) and Others (11%). Respondents' years of experience are dominated by young employees, which are 5 to 10 years (34%) and under 5 years (30%). Companies participating in this research might ask their younger employees to represent them, since the senior employees are busier to allocate their time for survey. This may also be caused by non-probability sampling with snowball reached to colleagues at around the same year of experience as the author.

Respondents' years of experience in the field is not far from their their years of experience in the company. Hence, they might work in the same company and remain loyal. Respondents' company ownership (excluding Local and Central Government) is dominantly private national (56%), followed by a similar proportion of state owned (23%) and private international (21%). Cargo Owners respondents are dominantly categorised as having "Other type of cargo" which is 28%, followed by automotive and sparepart industry (10%) and chemical and plastics industry (10%). Respondents are dominantly located in the capital, Jakarta Province (104 respondents).

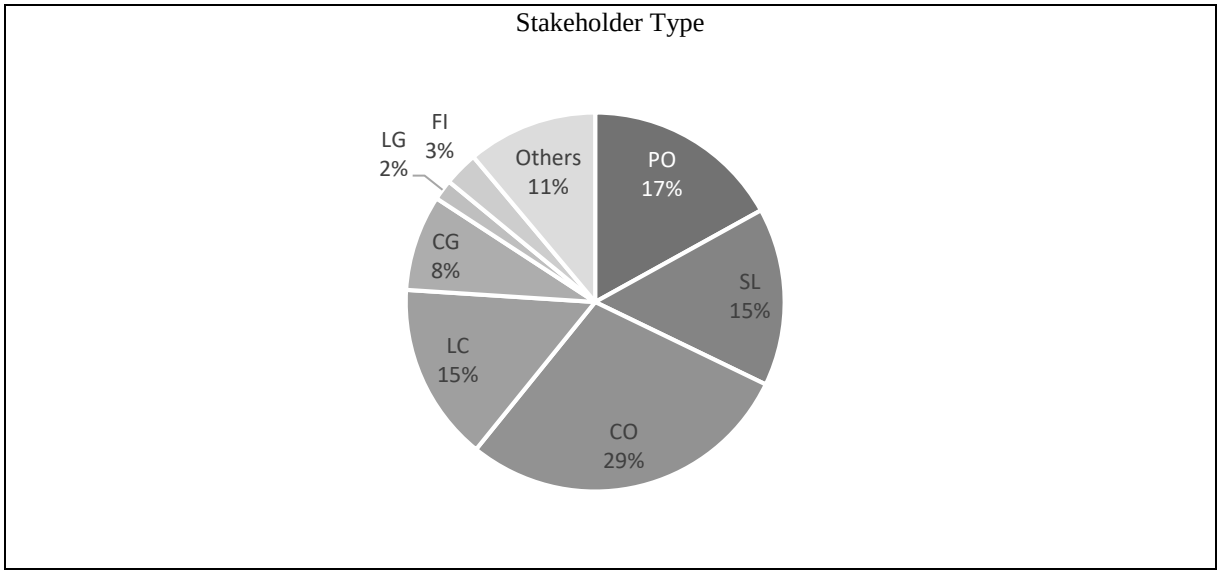
Non-Response Bias

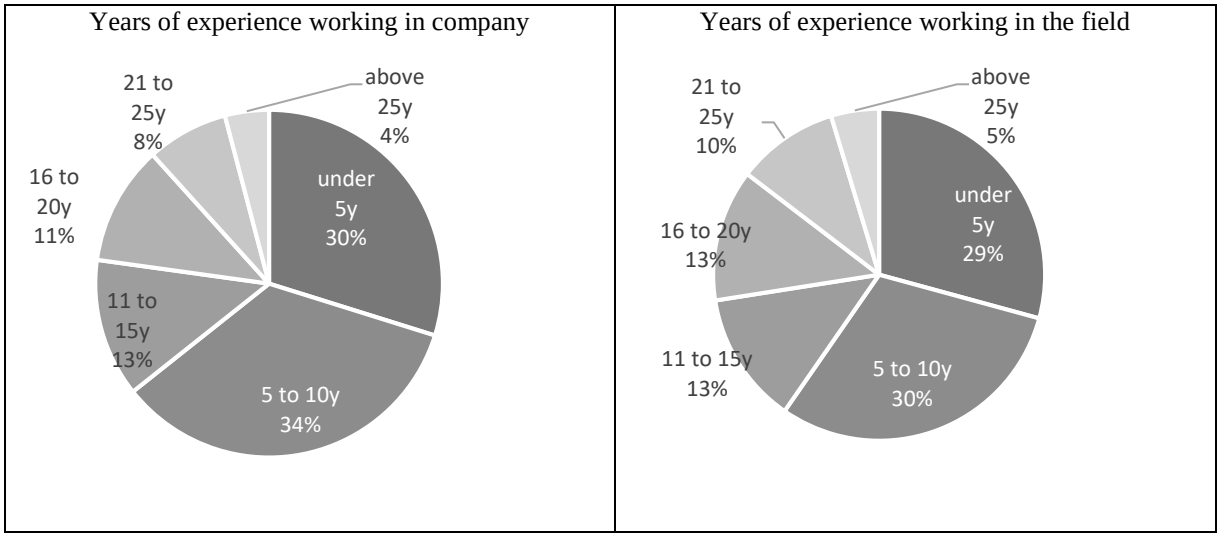
Non-response bias needs to be tested, considering the low response by some of the stakeholder types. Non-response bias is a bias caused by having a significant amount of participants which do not response and these people differ substantially to those who had responded (Armstrong and Overton 1977). As example, Templeton et al. (1997) conducted a survey for General Practitioners (GPs), which they considered having a low response rate of 44%.

Table 3.27 Respondent Profile for Each Stakeholder Type

		Total	Stakeholder Type							
			PO	**SL**	**CO**	**LC**	**CG**	**LG**	**FI**	**Others**
Years in company	<5	**51**	6	7	11	12	1	1	3	10
	5-10	**59**	15	10	20	6	3	1	0	4
	11-15	**22**	1	3	11	2	2	0	1	2
	16-20	**19**	5	2	3	4	4	0	0	1
	21-25	**13**	1	2	3	2	1	1	1	2
	>25	**7**	1	2	1	0	3	0	0	0
	Total	**171**								
Years in the field	<5	**50**	7	6	13	10	1	0	3	10
	5-10	**52**	13	9	17	4	4	2	0	3
	11-15	**22**	1	4	9	4	2	0	1	1
	16-20	**22**	4	3	5	5	4	0	0	1
	21-25	**17**	2	2	4	3	0	1	1	4
	>25	**8**	2	2	1	0	3	0	0	0
	Total	**171**								
Company Owner-ship	State owned	**35**	22	1	5	2	-	-	2	3
	Private National	**87**	3	19	31	19	-	-	1	14
	Private Internat.	**32**	4	6	13	5	-	-	2	2
	Total	**154**								
	TOTAL		38	52	93	35	24	6	10	10

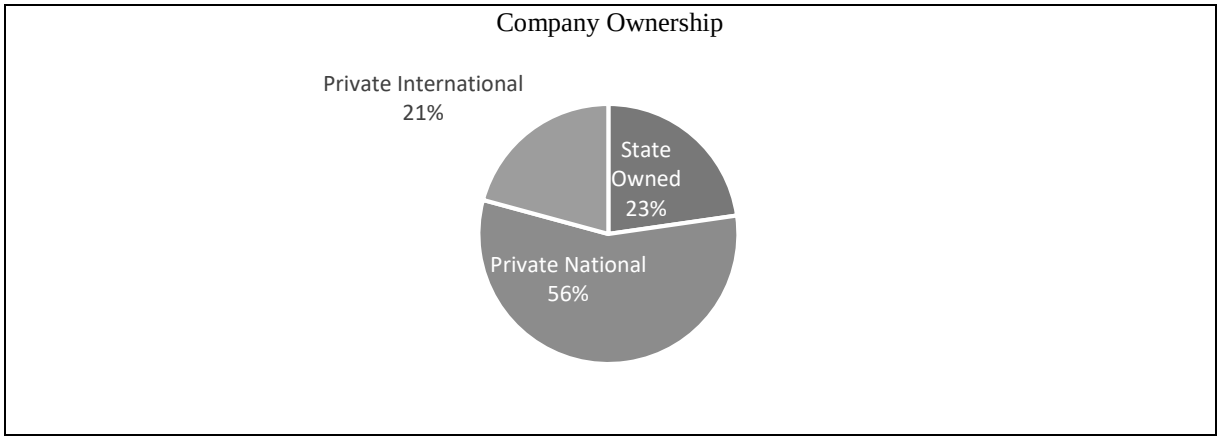
Source: Author, PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.





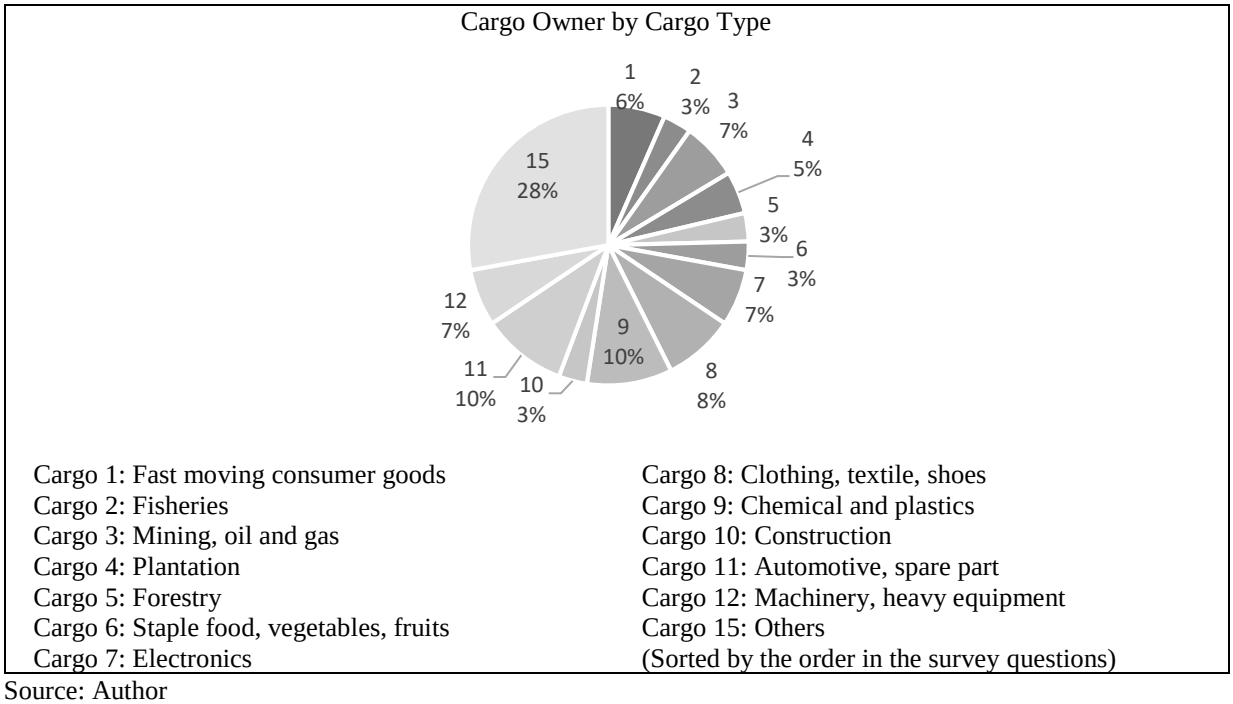
Source: Author

Figure 3.21 Respondent Profile in General



Source: Author

Figure 3.22 Respondent Profile by Company Ownership



Source: Author

Figure 3.23 Cargo Owner Profile by Cargo Type

Province number, Province name and number of respondents:

1: Aceh (1)	7: Bengkulu (1)	11: Banten (12)	17: Bali (0)	20: West Kalimantan (2)	24: North Sulawesi (1)	30: North Maluku (0)
2: North Sumatera (1)	8: South Sumatera (4)	12: Jakarta (104)	18: West Nusa Tenggara (0)	21: Central Kalimantan (0)	25: Gorontalo (0)	31: Maluku (0)
3: Riau (1)	9:Bangka Belitung (1)	13: West Java (21)	19: East Nusa Tenggara(0)	22: East Kalimantan (1)	26: West Sulawesi (0)	32: West Papua (2)
4: Riau Archipelago (0)	10: Lampung (5)	14: Central Java (3)		23: South Kalimantan (0)	27: Central Sulawesi (0)	33: East Papua (0)
5: West Sumatera (2)		15: Yogyakarta (0)		34: North Kalimantan (0)	28: South Sulawesi (2)	
6: Jambi (0)		16: East Java (7)			29: Southeast Sulawesi (0)	

Source: Author, provincial map source: http://www.indonesia-tourism.com/map/indonesia-map.html

Figure 3.24 Respondent Profile by Provincial Location

They compared the results of respondents from postal survey with follow-up telephone survey (who previously failed to respond to the postal survey. Results shows that telephone respondents has a significant higher average of alcohol misuser patients and feel better supported to deal with patients, which means that non-response bias exists (Templeton et al. 1997). A systematic literature review on non-response bias was conducted by Lindner et al. (2001) which concluded that commonly used methods to detect non-response bias is by comparing the first wave of responses with second wave, or in other words comparing the early responses to later ones. One of the study in their systematic literature review is the work of Connors and Elliot (1994) which uses T-tests to compare early and late responses in a total of 122 respondents. There are 2 other more advanced methods to detect non-response bias, however, these methods require a minimum of 20 responses to fulfil statistical power (Lindner et al. 2001).

T-test is a statistics tool used for hypothesis testing to compare two groups, whether they have significantly different average value (Sekaran 2003, pp.314-315). Therefore, overall 171 responses are split into two groups: the earlier responses and the later ones. T-test results for willingness to invest in both groups shows a t value = -0.06 and sig = 0.995 (see Appendix 7 Table 5). The significance value is >0.05, meaning there are no differences, hence, non-response bias based early and late responses is not an issue.

Furthermore, since respondents' location are quite centralised in Java Island as seen in Figure 3.24, a t-test is also done to compare respondents in and outside of Java Island. Results for willingness to invest in both groups shows a t value = 0.393 and sig = 0.695 (see Appendix 7 Table 5). The significance value is >0.05, meaning there are no differences, hence, non-response bias based on location of the respondents is not an issue.

3.3.4 Exploratory Factor Analysis

Introduction to Exploratory Factor Analysis

Researchers in social sciences and many other disciplines prevalently are faced with questions or problems caused by having a large set of observations or scores, for a group of people or objects, and want these measures parsimoniously represented in a a single score. In other words, they are investigating an underlying structure of associations for it. This is when factor analysis is used, to determine the number of distinct constructs assessed by a set of measures (Fabrigar and Wegener 2012). Unobservable constructs which are presumed to account for the structure of correlations among measures is identified as a factors or common factors (Fabrigar and Wegener 2012).

The identified structure could also be seen as a common underlying dimension of the variables (Hair et al. 2010, p.16). Factor analysis is one of the interdependence multivariate analysis or statistical approach, meaning it investigates structure of relationships among variables and does not have dependent variables (Hair et al. 2010, pp.13-16). De Vellis (2017, p.155) explained that there are four purposes of Factor analysis as follows: 1) to determine how many latent variables underlie a set of items; 2) explain variation among relatively a large size of original variables by using relatively few newly created variables; 3) to define substantive content or meaning of the factors that account for the variation within the larger set of items, which is by identifying groups of items that covary with one another and has a meaningful underlying latent variables; 4) to identify items that are performing better or worse, or which individual items do not fit into any of the factorially derived categories of items and better to be eliminated.

A considerable number of literatures on port selection uses EFA (explained in Section 3.1.5). Alternative methods to EFA which could be used in this Thesis are Confirmatory Factor Analysis (CFA), Structural Equation Modelling (SEM) and Analytic Hierarchy Process (AHP). Here are justifications for each of them not used in the Thesis.

First, on CFA. Confirmatory Factor Analysis differs to EFA fundamentally because its purpose is for hypothesis testing. It has a hypothesis-driven in nature, past evidence and theory must be established a priori, all aspects of the CFA model should be specified before calculations (Brown 2006). As example, previous theory or literature has established the number of factors that exist, also which item variables are related to which factors (Brown 2006). Other use of CFA are for Psychometric evaluation of test instruments, Construct Validation, Method Effects and Measurement invariance evaluations (Brown 2006). However, this research adopts latent and item variables from previous research (comprehensively in described in Section 3.4) which is never compiled together before in Indonesia's maritime transport specific context. Furthermore, EFA itself could answer the research question to identify the underlying factors to develop a hub port from a peripheral port. Hence the EFA conducted in this Thesis is not followed by CFA.

Second, on SEM. As mentioned in Section 3.1.5, Exploratory Factor Analysis originates from the work of Charles Spearman in the early 20th century. Combined with Sewell Wright's Path Analysis, in the 1970s, K.G. Joresgog, J.W. Keesling and D.Willey develops it further into JWK model – now known as Structural Equation Model (Kline 2016, p.23). The purpose of SEM is "*to test a theory by specifying a model that represents predictions of that theory among plausible constructs measured with appropriate observed variables"* (Hayduk et al. 2007 cited in Kline

2016, p.10). The output model predicted in SEM should have three attributes which are: theoretically makes sense, reasonably parsimonious and acceptably has close correspondence with data (Joreskog 1993 cited in Kline 2016, p.11). However, in this thesis, Exploratory Factor Analysis is determined to be used without further enquiry in SEM because SEM strictly requires a strong theoretical base (Hair et al. 2010, p.638). It is not possible in this thesis because there are no literature basis explaining concentration-deconcentration factors could lead to willingness of stakeholders to invest in peripheral ports.

Lastly, on AHP. Besides EFA, a substantial literature on port selection (Section 3.4) also uses Analytic Hierarchy Process (AHP) to analyse respondents' perception. AHP is a theory of measurement developed by Thomas Saaty in the 1970s. AHP captures perception of respondents, especially experts' judgements, by comparing two alternatives at a time known as pairwise comparison (Saaty 2008). AHP uses criterias and attributes to decide which decision alternatives are better, with priority scales that measures intangible variables as the output (Saaty 2008). The objective of this research is to identify critical factors resulting to willingness of different stakeholders. It could also benefit having a ranking or prioritisation among the variables and factors identified. However, AHP is considered not appropriate here because there are 111 item variables, which is too much and too complicated for respondents to compare them pairwise.

Moreover, requirements or preliminary tests prior to conduct Exploratory Factor Analysis (EFA) are sample size, normality test, conceptual linkages, multicollinearity test and bias tests, summarised in Table 3.28.

Sample Size

To be able to conduct Exploratory Factor Analysis (EFA) on the survey data, a sufficient sample size is required. Factors obtained might not be well generalised if it comes from small sample compared to larger sample (Pallant 2016). Hair et al. (2010, p.102) provide guidelines that sample size should be larger than variables, minimum sample size is 50 cases and preferably more than 100 cases. Pallant (2016, p.184) and Field (2018, p.797) discusses the different point of views by statisticians, summarised in Table 3.29, and suggested that to be safe there should be 300 cases for EFA. However, since reminder emails and messages has been sent three times to respondents and with limited time to conduct the survey, a sample size of 171 cases is considered sufficient based on rule of thumb by Hair et al. (2010). Another way to test whether sample size is enough or not is by testing Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (Field 2018, p.798), and this is described later in Section 5.2.3.

Table 3.28 Procedures in Quantitative Data Analysis Prior Exploratory Factor Analysis (EFA)

No.	Procedures and Tests	Requirement	Results in this study	Interpretation
	Preliminary Test for Exploratory Factor Analysis			
1.	Sample size	The sample must have more observations than variables, the minimum absolute sample size should be 50 observations and preferably should be 100 or larger (Hair et al. 2010, p.102).	After data cleaning, 171 responses are above 93% completion, with finished answers until variable X7.	Sample size of 171 data is sufficient.
2.	Normality Test and basic assumptions	Data should be normal, has homoscedasticity, linearity and absence of correlated errors. Rule of thumb detects normality by the data's skewness and kurtosis value, most commonly used critical values are ±2.58 (0.01 significance level) (Hair et al. 2010, pp.72-76).	All items are normal except item X1.8 (safety and security) and X2.3 (cranes).	Since likert scale are not always perfectly normally distributed, hence, all 171 data are sufficient to be analysed in EFA.
3.	Conceptual linkages	There should be supporting literature to select item variables used in EFA	All the 111 items in this study have been supported by literature and interview results.	111 items are sufficient to be analysed.
4.	Multicollinearity Test	Some degree of multicollinearity is desirable, because the objective is to identify interrelated sets of variables (Hair et al. 2010, pp.103-104): • Barlett test of spericity statistical significance (< 0.05). • Measure of sampling adequacy (MSA) with KMO 0.80 or above as meritorious; below 0.50 as unacceptable.	• Barlett test of spericity is significant. • Measure of sampling adequacy (MSA) with KMO is 0.803.	Data is sufficient to be analysed in EFA.
5.	Test for Bias	Common Method Bias which includes social desirability bias, is commonly detected by Harman's one factor test (Fuller et al. 2016).	Cummulative variance explained in a single factor is 25.56%, which is bellow 50% (Appendix 7 Table 1).	Hence, CMB is not a problem.

Source: Author

Table 3.29 Suggested Sample Size for Exploratory Factor Analysis

Sample Size for EFA	Source
Minimum 300 cases, or a minimum of 150 cases if solution provides factor loadings above 0.80.	Tabachnick and Fidell (2013):
100 cases as poor sample size, 300 as good and 1000 as excellent.	Comrey and Lee (1992)
Sample size can be ignored if a factor has 4 or more loadings >0.6; sample size >150 if 10 or more loadings >0.40; sample size should be more than 300 if there are few low loadings not interpreted.	Guadagnoli and Velicer (1988)
Cases should be 10 times as many as the variables.	Nunnally (1978)

Source: Pallant (2016, p.184) and Field (2018, p.797)

Normality Test and Basic Assumptions

Normality of data is detected from its skewness and kurtosis as a rule of thumb, with commonly used critical values of ±2.58 and a significance level of 0.01 (Hair et al. 2010, pp.72-76). Results shows normal distributions for all item variables, except for item X1.8 and X2.3 which has a negative skew and positive kurtosis greater than 2.58. Most respondents gave a high response for item X1.8 (safety and security) and X2.3 (cranes for loading-unloading) because they perceive them important in a peripheral port. Responses for item X1.8 and X2.3 are described in the following Table 3.30.

Table 3.30 Items that Violates Normality

	Item Variable	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
X1.8	Safety and security	4.0	7.0	6.74	.57	-2.70	.18	8.28	.36
X2.3	Cranes for loading-unloading	3.0	7.0	6.61	.71	-2.13	.18	5.09	.36

Source: Author

Nevertheless, the nature of likert scale are not perfectly normal. In actual studies, normal distributions are rare (Kline 2016, p.51). Fabrigar et al. (1999, p.277) explained that Likert scales and non-normal data are widely accepted to be analysed in EFA with Principal Component Analysis (PCA). Unlike Maximum Likelihood (ML), PCA is more relaxed since it entails no distributional assumptions (Fabrigar et al. 1999). In this study, PCA was used as the factor extraction method in IBM SPSS 23 and is explained next in Section 4.5.4. Hence, the negatively skewed item which violates normality is still analysed in EFA and will be examined in more detail after the EFA results are achieved. Moreover, tests for homoscedasticity, linearity and homogeneity of sample are unnecessary since data analysed in EFA are likert scale all together (Hair et al. 2010, p.103).

Conceptual Linkages

Conceptual linkages mean that some underlying structures exist in the set of selected variables to be analysed in EFA (Hair et al. 2010, p.103). A comprehensive literature review and variable selection has been conducted. Hence, conceptual linkages have been prepared very well.

Multicollinearity Test

Multicollinearity means interrelatedness, which is required for EFA to capture interrelatedness from overall individual item, from overall as well as from individual variable perspectives (Hair et al. 2010, pp.103-104). Multicollinearity is detected from Measure of Sampling Adequacy (MSA) and Barlett Test of Spericity (Hair et al. 2010, pp.103-104). MSA measures the degree of intercorrelations among the variables. Kaiser and Rice (1974) cited in Field (2018, p.798) provided guidelines for MSA values as follows: above 0.90 as marvellous, above 0.80 as meritorious, above 0.70 as middling, above 0.60 as mediocre, above 0.50 as miserable, below 0.50 as unacceptable. Meanwhile, Barlett Test of Spericity provides statistical significance that the correlation matrix has significant correlations among at least some of the variables. Bartlett's test of sphericity should be significant ($p<0.05$) for the factor analysis to be considered appropriate (Hair et al. 2010, pp.103-104; Pallant 2016, p.84).

Moreover, Kaiser-Meyer-Olkin (KMO) is a measure of sampling adequacy that could be calculated for individual and multiple variables, to indicate whether more data should be collected or whether there are too many variables included in the EFA (Field 2018, p.798). A value of 0 indicates that the sum of partial correlations is large relative to the sum of correlations, implying that factor analysis is inappropriate. A value close to 1 means that patterns of correlations are compact, distinct and reliable factors. MSA for individual item variables are detected by loking at KMO values for each item produced on the diagonal of the anti-image correlation matrix. The diagonal elements in the anti-image matrix with a score below 0.5 should be eliminated and then the overall MSA is tested again, and this process one-by-one is repeated until all items are above 0.5 (Hair et al. 2010, p.104; Field 2018, p.807-808).

MSA value in this study has shown a ‘meritorious results’ which is 0.803. Bartlett’s test of Sphercity is significant under 0.05. MSA for individual item variables are all above 0.5, with a minium of 0.501 for X1.2 and a maximum of 0.904 for X2.9. Results from multicollinearity tests are shown in Table 3.31. It shows data has a sufficient multicollinearity to be analysed in EFA.

Table 3.31 Multicollinearity Test Results

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.803
Bartlett's Test of Sphericity	Approx. Chi-Square	14443.869
	df	6105
	Sig.	0.000
KMO for individual item vaiables on the diagonal of the anti-image correlation matrix are overall above 0.5.	A minimum of 0.501 for X1.2 and a maximum of 0.904 for X2.9.	

Source: Author, results from IBM SPSS 23

Common Method Biases

Behavioural research is threatened by Common Method Bias (CMB), where measurement model affects the actual constructs it is trying to measure (Podsakoff et al. 2003). CMB is known as a problem since it is one of the main sources of measurement error, could be at random or systematic, which threatens the validity of the conclusions about the relationships between measures (Podsakoff et al. 2003). In their research, Podsakoff et al. (2003) mentions various potential sources of CMB, summarised in Table 3.32.

Techniques for Controlling CMB are procedural remedies and and statistics remedies (Podsakoff et al. 2003; Fuller et al. 2016). Procedural remedies are as follows (Podsakoff et al. 2003, pp.887-888): Acquire different sources to measures the predictor and criterion variables; Separate measurement related to temporal, proximal, psychological or methodological; Protect respondent anonymity and reduce evaluation apprehension; Counterbalance order of questions; Improve scale items, such as define terms that are unfamiliar or ambiguous, use concise and simple questions, verbalise labels for the scale's midpoint. Specifically, on Social Desirability Bias, it is common to appear in marketing or social science surveys related to respondents' tendency to show "good behaviour" or favourably accepted by others (Fisher 1993). It can be reduced by using indirect questioning, to make respondents more honest in interviews (Fisher 1993). This survey is self-administered; hence, social desirability bias could also be reduced.

Futhermoe in this survey, 8 categories of stakeholder type show that respondents come from different sources. There are also companies or institutions that are represented by more than one respondents. Furthermore, other procedural remedies have been applied since the beginning or improved after the pilot study is carried out. Hence, common method bias in the final survey have been minimised. Meanwhile, statistical techniques commonly use to detect CMB is Harman's Single Factor test (Fuller et al. 2016). In IBM SPSS 23, Harman's test is conducted by running factor analysis, extracted to a fixed number of factor, which is 1 and without rotation (Gaskin 2011; Fuller et al. 2016). If the results show a percentage of variance more then 50%

then it means that there is a problem. In addition to the procedural remedies, Harman's Single Factor test has been carried out to all item variables (X1.1 to X8.8) and the result shows that it presents 25.56 % of variance (Appendix 7 Table 1). Hence, CMB in this survey is under control.

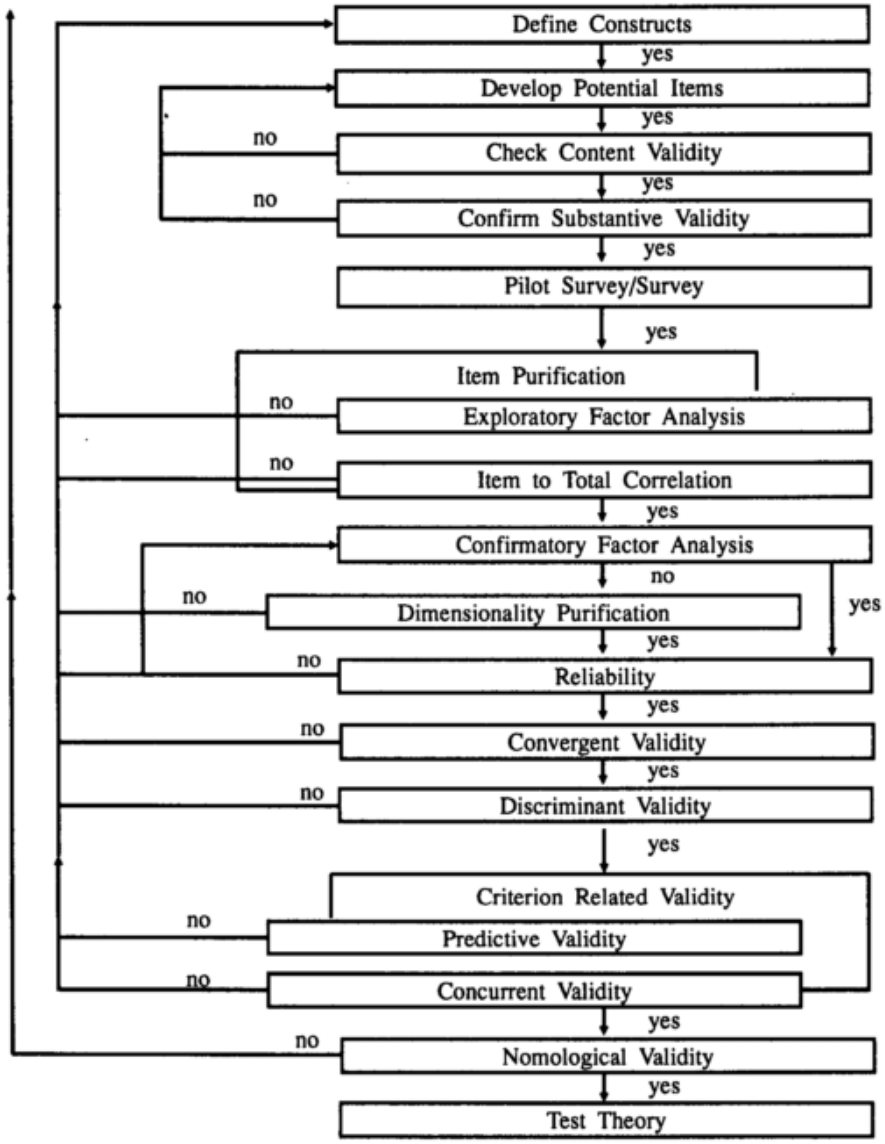
Table 3.32 Potential Sources of Common Method Biases

Potential Source	Explanation
Common rater effects (from the respondents)	Resulting from having the same respondent to measure the predictor and criterion variable. Their responses could become bias from the following: • attempt to maintain consistency (*consistency motif*), • attempt to show illusory correlations and assumptions (*implicit theories),* • attempt to show their behaviour is accepted by society (*social desirability),* • to rate other people they know well (*leniency bias),* • to have a tendency in agreeing or disagreeing something without understanding the content (*acquiescence),* • to respond positively or negatively based on their mood (*mood and transient mood state*).
Item characteristic effects (from the item questions)	Resulting from personal tendencies when respondents are exposed to specific item characteristics. Their responses could become bias when they meet items with the following characteristics: • which show their behaviour is accepted by society *(item social desirability)* • which has multiple meanings, jargons or ambiguity *(item complexity and ambiguity)* • which is caught up with the Likert scale *(item scale format)* • which makes them unaware of negative sentences *(item with negatively worded)*
Item context effects (from the item context)	Resulting from the context underlying item's questionnaire. Their responses could become bias when they meet item context as follows: • A particular item becomes more salient because of another item previously asked *(item priming effects)* • A neutral item is carried over into positive/negative context because of another item previously asked *(item embeddedness)* • A certain wording of an item brings transient positive or negative mood *(context-induced mood)* • A short scale, e.g. Likert is possible to make responses influenced by other items previously asked *(scale length)* • A similar construct name, e.g. job characteristics and job satisfaction *(Intermixing items of different contstructs)*
Measurement context effects (from the measurement)	Resulting from a broader context of the survey, such as influenced by time, location and media used.

Source: Summarised from Podsakoff et al. (2003)

3.3.5 Reliability and Validity of Quantitative Data Analysis

Reliability and validity represents quality of the survey and data (Dunn et al. 1994; Fink and Kosecoff 1998; Sekaran 2003). Having reliability and validity test on the quantitative model is to assess the degree of generalisability of results to the population (Hair et al. 2010, p.142). The process of scale development and validation in business logistics research has been mapped by Dunn et al. (1994), as seen in Fibure 3.25. They mentioned it as an iterative and sequential process. Their main steps after defining constructs are: Item purification; Dimensionality purification; Criterion related validity and Nomological validity.



Source: Dunn et al. (1994, p.156)

Figure 3.25 Process of Scale Development and Validation in Business Logistics Research

After pilot survey and survey, Exploratory Factor Analysis is conducted as item purification, which is then followed by Confirmatory Factor Analysis (Dunn et al. 1994). CFA is able to verify the number of underlying dimensions of instruments (i.e. factors) also the pattern of item-factor relationships (i.e. factor loadings) (Brown 2006). CFA is able to estimate scale reliability of test instruments better than traditional methods such as Cronbach's Alpha (Brown 2006). Nevertheless, in this thesis survey, Confirmatory Factor Analysis is not conducted as explained earlier in Section 4.5.2 and the use of Cronbach Alpha is considered sufficient. Another the way to ensure data quality is by using a 'ready-to-use surveys', which are established survey questions

that are reliable and valid, prepared and tested by someone else in previous research (Fink and Kosecoff 1998, p.34). This thesis does not use a ready-to-use survey; hence, reliability and validity are tested, still with considerations that this is an exploratory type of research.

Reliability

A reliable survey will provide a consistent measure of important characteristics, reflects a true score, also free from random errors, eventhough respondents' background varies (Fink and Kosecoff 1998, p.33). According to Fink and Kosecoff (1998, pp.33-34) and Sekaran (2003, pp.306-307), there are three types of reliability test: 1) Test-retest, to see that a respondent answers the survey about the same on more than one occasion or in different time periods; 2) Equivalence or split half reliability, to see that a respondent answers the same scores if they are given two different forms or two halves of a set item; 3) Internal consistency, to know that the survey questions are consistently measuring characteristics, attitudes or qualities that they are supposed to.

In this thesis, the two earlier tests for reliability are not conducted since pilot study has been done. For the third test, internal consistency, this can be examined after the survey by a statistic calculation which is the Chronbach's alpha. It indicates how well the items in a set of latent variables are positively correlated to each other, with a closer number to 1 means a high internal consistency reliability (Sekaran 2003, pp.306-307).

Validity

Whereas reliability relates to its consistency, validity relates to its soundness or accuracy. There are 6 types of validity tests that are generally used (Dunn et al. 1994; Fink and Kosecoff 1998; Sekaran 2003) which are content validity, construct validity, convergent validity, discriminant validity, criterion-related validity and nomological validity. Content validity examines whether the survey item questions accurately represent the characteristics or attititudes they intended to measure, which could be done by asking related experts (Fink and Kosecoff 1998, pp.33-34). This has been done twice, which were before and after pilot survey was conducted. Construct validity is examined experimentally by conducting the survey on respondents, in other words conducting the EFA calculations itself, to identify the constructs (Fink and Kosecoff 1998, pp.33-34).

Convergent validity examines whether there is high degree of correlation between different sources who responded to the same measure or construct (Sekaran 2003, pp.307-308). Discriminant validity examines whether two distinctly different concepts or items are not

correlated to each other if they are not in one construct (Sekaran 2003, pp.307-308). Criterion-related validity examines whether the measure has power to differentiate participants who are known to be different, which can be to predict (predictive validity) or in current situation (concurrent validity) (Dunn et al. 1994; Sekaran 2003). Lastly, nomological validity examines whether the a construct relates to other constructs in a way which is aligned and consistent with the underlying theory (Dunn et al. 1994). The last four types of validity tests and one reliability test Cronbach Alpha for internal consistency are conducted and explained in Chapter 5 Section 5.2.4 after EFA.

3.4 Conclusion

This chapter has explained everything related to methodology of the Thesis. Justifications in research methodology is clarified, including alternative ways to conduct the research. Eventually, all decision making related to methodology are chosen as the best way to investigate and answer the 4 research questions. These decisions are: pragmatist philosophical position, survey research strategy, mixed methods with qualitative interviews and quantitative online survey, non-probability sampling, and Stakeholder Theory as theoretical lens.

The research processes, both qualitative and quantitative, has been conducted carefully. The total respondents in the qualitative interviews reached 46 people from 7 types of stakeholers (port operators, shipping lines, cargo owners, logistics companies, central government, local government and financial institutions). Interviews were transcribed and analysed using Nvivo 11 software. Results from interviews provide insights for variable selection and survey questionnaire development. The total respondents in the online survey reached 171 people. Data were next prepared and analysed using Exploratory Factor Analysis, supported by IBM SPSS 23 software. The output from this Chapter is used as input for Chapters 4 to 6, which covers findings and discussions for each research question of the Thesis.

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Chapter 4

Peripherality in Indonesia's Maritime Transport Sector

> *"Whoever wants pearls, must be brave to dive in the deep ocean"*
> (Ir. Soekarno – Indonesia's Founding Father and First President)

This chapter explains findings, discusses and answer the first research question on the meaning of peripherality in maritime economics. It combines input from literature review (Chapter 2), research methodology, and qualitative research process (Chapter 3).

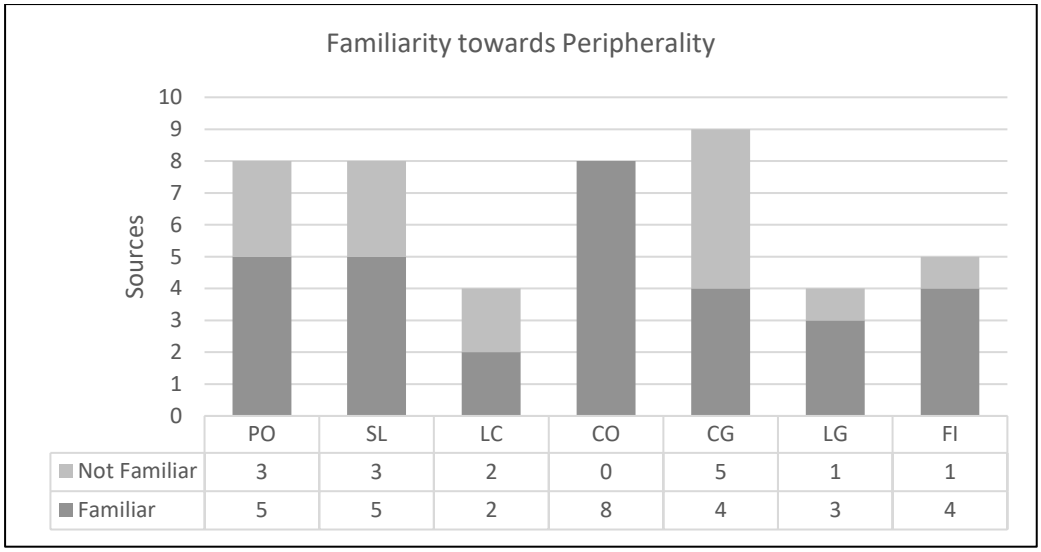
4.1 Findings from Main Interviews

Findings related to perception of peripherality in Indonesia's maritime transport sector are divided into four main parts. These consist of perception of peripheral ports and peripheral locations (Section 4.1.1), transhipment and growth measurements (Section 4.1.2), and the perception of Indonesia's hub and peripheral ports (Section 4.1.3).

4.1.1 Perception of Peripheral Ports and Peripheral Locations

Familiarity towards Peripherality

In order to understand the wider implications of peripherality, the researcher first investigated stakeholder perceptions of the terms peripheral and peripherality. Responses by stakeholder type are shown in Figure 4.1.



	PO	SL	LC	CO	CG	LG	FI
Not Familiar	3	3	2	0	5	1	1
Familiar	5	5	2	8	4	3	4

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Figure 4.1 Respondents' Familiarity towards Peripherality

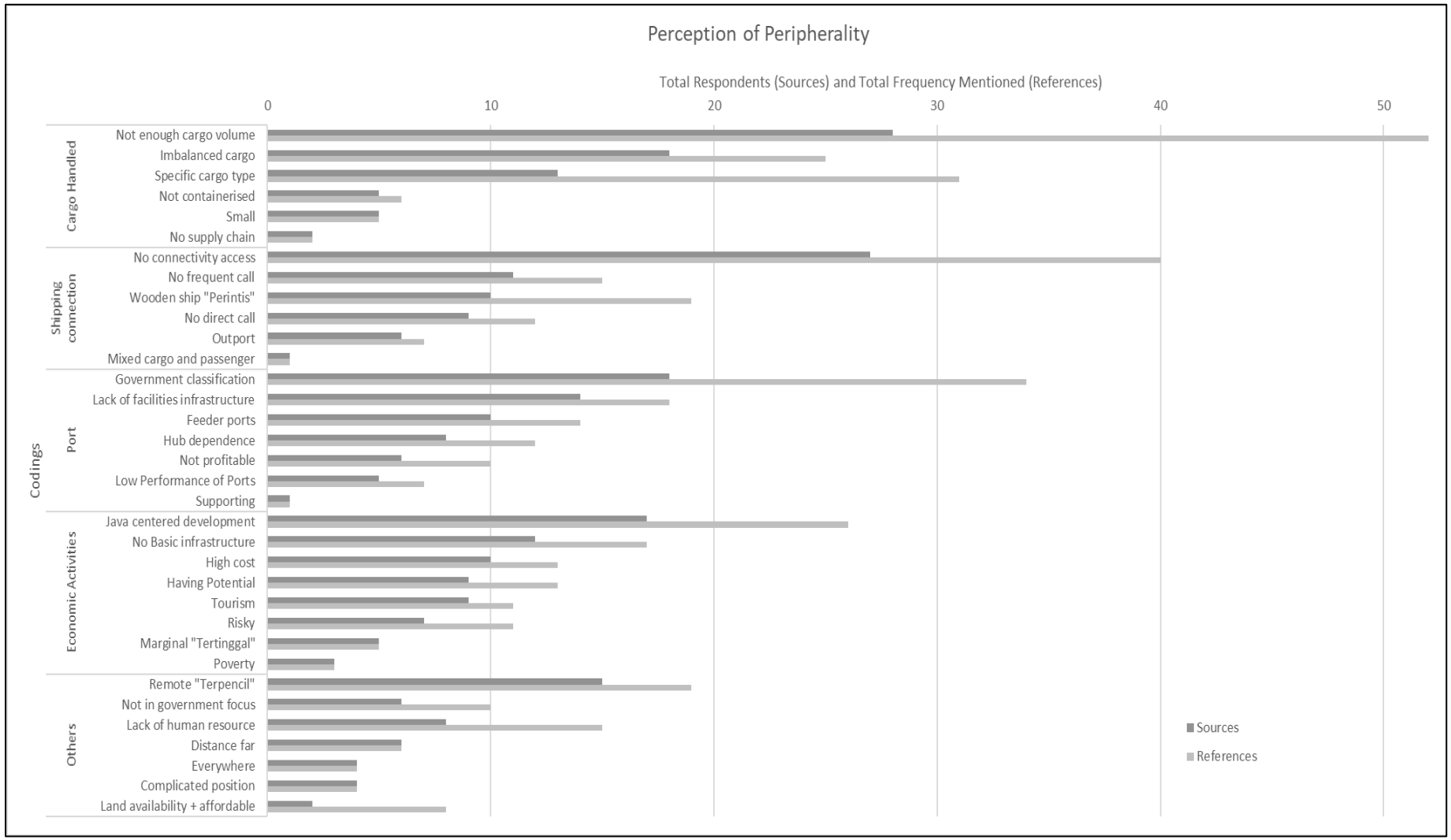
In addition, this question also helped to identify which stakeholders actually use the terminology in their organisations. Results show that 33% of the respondents (or sources) confirmed they were not familiar, while 67% confirmed they were familiar and explained the meaning from their point of view. Respondents who were familiar were mostly from Cargo Owners. Those not familiar were mostly from Central Government.

Perception of Peripheral Ports and Peripheral Locations

Responses given on peripheral ports and peripheral locations resulted in 34 codes which are futher grouped **into 5 main themes: cargo handled, shipping connection, port, economic activities, and others (related to geography and politics).** The following Figure 4.2 shows the codings for perception of peripherality and its occuring frequency sorted from the most respondents (sources) and most frequently mentioned (references).

First, within the 'Cargo handled' theme, peripheral ports are perceived to have low cargo volume – or not enough cargo volume, imbalanced cargo, handles specific cargo type, not containerised, small and having no supply chain. Respondents dominately perceive peripherality as having not enough cargo volume (28 sources), as example they stated that *"the cargo itself is not enough… lets say Bitung port has sufficient volume then we can make direct call there with our ships without using domestic players"* (SL_5); *"We have more budget for development in the east than the west, however, now where is the cargo?"* (CG_9). This means most respondents blame peripherality for low cargo volumes.

There were 18 sources who perceived peripheral ports to have imbalanced cargo with the hub which is also because of low cargo volume hence ships will be empty on their return trip from peripheral ports. There were 13 sources who perceive peripheral ports handles specific cargo type, not only containers. Next, 5 sources and under perceive peripheral ports not yet able to handle containerised cargo, small in overall size of the port and port organisation, and lastly no supply chain because of lack of infrastructure and low frequent ship call. As example a cargo owner stated *"Some people ask why we (a car manufacturer) do not build a factory in Sulawesi, Jayapura, Sorong. Well we don't only look at land availability or lower cost, we also look at the infrastructure, is there electricity, supply of human resource for labour, raw materials. Let's say in Sorong, it is not easy, are there any suppliers?" (CO_6).*



Source: Author

Figure 4.2 Frequency Data on Perception of Peripherality

Second, within the 'Shipping connection' theme, peripheral ports are perceived to have low or no connectivity access, no frequent ship call, served by Indonesian wooden ship and *"perintis"* ship, no direct call, 'outport' and having connections with ships carrying mixed cargo and passenger. No connectivity access is the second most perception of peripherality (27 sources) after low cargo volume. One of the local government respondent stated, *"overall they have the same needs, which is connectivity between regions" (LG_2).*

Peripheral ports having no frequent call (11 sources) is similar to low connectivity access, the difference is that it stresses on the frequency. For example, a central government official stated, *"They usually are isolated locations like in Sulawesi where it is an archipelago, the one and only access for them to be connected to other islands is by sea. They must wait once every 2 weeks. We have provided the port but still the perintis ship only comes once every 2 weeks" (CG_4).* The terminology "*perintis"* itself means "pioneer" in English. For wooden ship and *perintis* ships (10 sources), peripheral ports are considered as ports served by wooden ship *"kapal rakyat"* meaning "grassroot people ship" and *"perintis"* ship meaning subsidised by government for its operations. Central government officer CG_4 ad CG_9 described these two terms summarised as follows: Wooden ship are grassroot people's ship made from wood; *perintis* ship is different; *perintis* is a ship provided and subsidised by government, size around 750 TEU; could carry passenger, cargo, livestock or mixed; government is opening more routes for *perintis* ship such as from Surabaya to Papua (Eastern Indonesia); from 6 route this year it is planned to be added up to 13 routes.

There were 9 sources who perceive peripheral ports having no direct shipping call. This means that the connectivity exists, however, not direct from the existing hubs. As example, a cargo owner stated *"If we want to send our product to the Eastern part, vessels to the Eastern such as to Lombok, Timor and Nusa Tenggara are from Surabaya, not from Jakarta. Hence, we need to send 1 truck to Surabaya, then to be sent to the Eastern locations" (CO_2).* Meanwhile, responses under 8 sources perceive peripherality as 'outport' and ports served by ships carrying mixed cargo and passenger. The terminology 'outport' is used by the shipping lines. Most of the international shipping lines perceived it as outport which means domestic ports outside the main hub and not directly connected to international trade. As example, a shipping line respondent explained outport as follows: *"Makassar is one of our domestic ports, which we also mention as outports which means until today there are no direct shipping service to Makassar, still via Jakarta (SL_6)."* This implies that they perceive peripheral ports as indirect services and related to domestic trade.

Third, within the 'Port related theme, peripheral ports are perceived to follow government classification, lack of facilities and infrastructure, feeder ports, hub dependence, not profitable, low performance of ports and supporting ports. Respondents dominately perceive peripherality as confirming government's classification or hierarchy made by the government (18 sources), which are main port, collector port and feeder port. As explained in Section 3.4.2 on Indonesia's port system, the port hierarchy is written in Government Regulation PP no. 61 year 2009 and Ministerial Decree from the Ministry of Transport No. KP 901 year 2016 on National Port Masterplan. It is written that the port hierarchy consist of: 1) Main Port *(Pelabuhan Utama)* also called Indonesia's hub for international cargo or export/import which includes 28 ports; 2) Collector Port *(Pelabuhan Pengumpul)* which includes 181 ports, and Feeder Port *(Pelabuhan Pengumpan)* which includes regional feeder of 105 ports and local feeder of 26 ports. The word *"pengumpan"* itself comes from the original word "*umpan*" which means bait, lure or attract.

However, respondents' perceptions are split into two views, one supporting government's classification and one contradicting it. Respondents that support government's classification mentions that they agree peripheral ports are the feeder ports because they are small and positioned at the lowest level of the hierarchy. As example cited from CG_4 and CG_9, they acknowledge government's category by ownership of the port, which are general port for public use and specialised port for certain company use. They also acknowledge government's category by commercial use (operated by *Pelindo*) and non-commercial use (operated by Ministry of Transport). Meanwhile, respondents with contradicting views show the government's classification lacks explanations on the hub function and what activities hubs do in the real world. Hence, more are considered as peripheral. For example, PO_3 stated *"Terminology of hub for us is specific, meaning we use the term 'Collector Port' only for small ports consolidating cargo. Meanwhile, the hub terminology is specifically for 'Main Port' Tanjung Priok and Surabaya. We do not consider Makassar and Belawan as a hub, they are only as a 'Collector Port', which means they collect from feeder ports" (PO_3).* More findings related to the port hierarchy will be explained next in Section 4.1.3.

There are 14 sources who perceive peripheral ports lack of facilities and infrastructure. This will be explained further in Section 4.1.2 on critical facilities for peripheral ports to become a hub. There were 10 sources who perceive peripheral ports as feeder ports. They mention the exact terminology 'feeder' which is the same used in literature. Their perception of a feeder relates to the function of the peripheral port. This shows that practitioners are directly or indirectly aware that peripheral ports are on the lowest position of the port hierarchy after hub port and secondary

hub. It also relates with being a spoke in the hub-spoke network as explained by SL_7 and LC_2. Respondents from port operators described it as follows: *"what I understand, peripheral port is some type of feeder for collector ports" (PO_2); "development of large ports is related to smaller ports which will function as feeder or collector" (PO_3); "it is very important for our company because they can be feeders" (PO_5).*

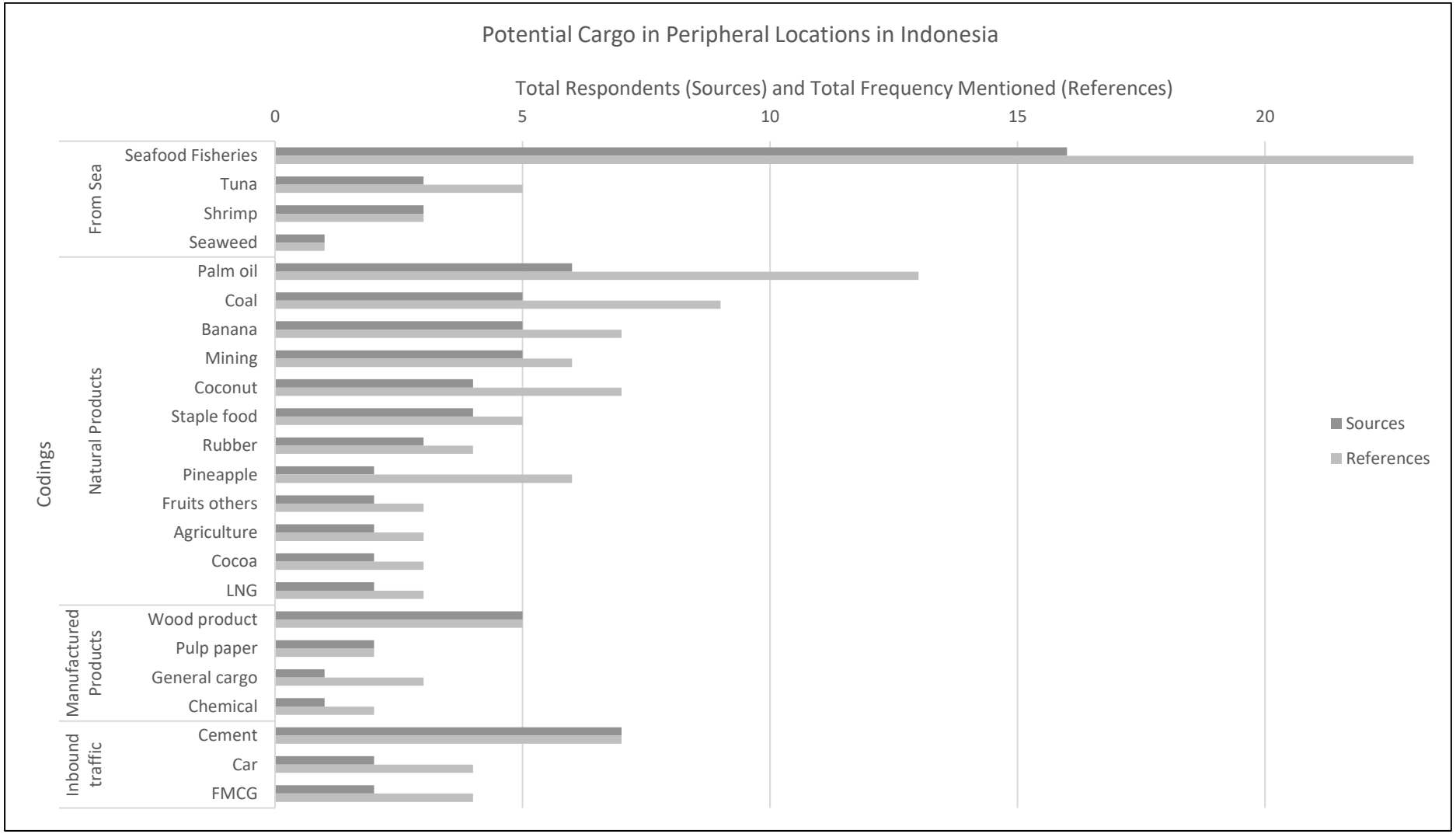
There were 8 sources who perceive peripheral ports as hub dependent, which is similar to how they perceive peripheral ports with no direct call. The difference is that it mentions which hub port they are dependent on. As example, a shipping line source stated *"for Eastern Indonesia it all must go through Surabaya, while for Western part it tends to go through Jakarta… We have a dedicated terminal in Kaohsiung, it is true that Singapore is closer. However, we are more to Hong Kong and Taiwan because it is the bridge to connect with the Trans Pacific" (SL_8).* Meanwhile, responses from under 8 sources perceive peripherality as not profitable to be operated commercially, having low performance which also relates with low facilities and low quality human resource, and as a 'supporting' port for the collector ports.

Fourth, within the 'Economic activities' theme, peripheral ports and peripheral locations are perceived to be the opposite of Java Island as centre of development, no basic infrastructure, high cost, have potential (i.e. potential commodities or industries), tourism locations, risky for investments, marginal *"tertinggal"*, and poverty. 17 sources mentioned Java Island as the centre development of the country, hence, it is seen worth to be coded. This shows that the historical aspects, as explained in Section 3.4.1 a brief history of Indonesia is still taking effect for the country's maritime transport and development until today. As example, a government official stated *"The current government today has a programme to develop Indonesia from its edge/periphery, how important these remote areas are. We have a gap / inequality from east west north south, cities and villages, also in income distribution. If we analyse it, development centres are still in Western of Indonesia, especially in Java. Remote areas should be built as strategic economic activities. Because of the topography and archipelagic nature, hence, transport sector is critical to be developed. Because transport is becoming significant barriers for development to go there" (CG_2).*

There were 12 sources who perceive peripheral locations have no basic infrastructure for development such as electricity, water, or road. As example a local government official stated *"the location is considered marginal if the population structure has a minimal in economics, information, education, energy, powerplant"(LG_1);* a cargo owner stated *"If the government*

provides the infrastructure, private sector will come… if there is no port, no electricity, and private companies are expected to build them, we can not afford it" (CO_3); also a logistics company stated *"hows the internet, the water, the electricity there?" (LC_2).* There are 9 sources, from shipping lines and cargo owners, who perceived peripheral locations as having potential. A shipping line respondent expressed *"The stance of shipping in Indonesia see outport as potential"(SL_8).* Furthermore, additional codings were identified across all stakeholders, potential cargoes in peripheral locations in terms of any commodities mentioned are coded. These commodities are summarised in Figure 4.3. Dominantly sources mentioned that Eastern Indonesia or peripheral locations in Indonesia produce fisheries, followed by natural resource products such as palm oil, banana, coconut, coal and other minings products. On the other hand, the inbound cargo that they mostly import are cement, cars, and FMCG. The rest of the codings in 'Economic activities' theme shows that peripheral locations in Indonesia are similar to general literature on peripherality. It shows the characteristics which are usually considered to developed into tourism sites, risky for private companies to invest or expand their business to, marginal or *"tertinggal"* which is an Indonesian word meaning "left behind" or "underdeveloped" and relates to poverty or poor communities.

Lastly, within the 'Others' theme, peripheral ports and peripheral locations are perceived to be remote *"terpencil"*, not in government focus, lack human resources, peripherality could be everywhere (in every island), in a complicated position and having available and affordable land for expansion. These codings shows perception on peripheral locations more general, such as related to geographical location, political position and human resource. There are 15 sources who perceive peripheral locations as remote or *"Terpencil"*. In Indonesian language *"Terpencil"*, meaning remote, isolated, on the edge. As example, a central government official stated *"Here we have priorities in development, we have the 'tertinggal' - left behind regions, border regions, most-front or most-outer regions. They are non-commercialised regions which should be taken care by the government" (CG_7).* The meaning also correlates with no transportation acess and no basic infrastructure. For example, a cargo owner stated, *"For remote locations, not all of our products could reach the edge corners – remote spots" (CO_7);* and a port operator stated *"We are investors in ports, we usually are located in major locations… remote locations are a question mark. What could be taken out from there, what are source of activities there, what about the surrounding environment, electricity, water, depth, shipping network. That is what needs to be considered. If the location is not supported by the government to develop in the future then it will be difficult" (PO_6).* The rest of the codings in this theme are



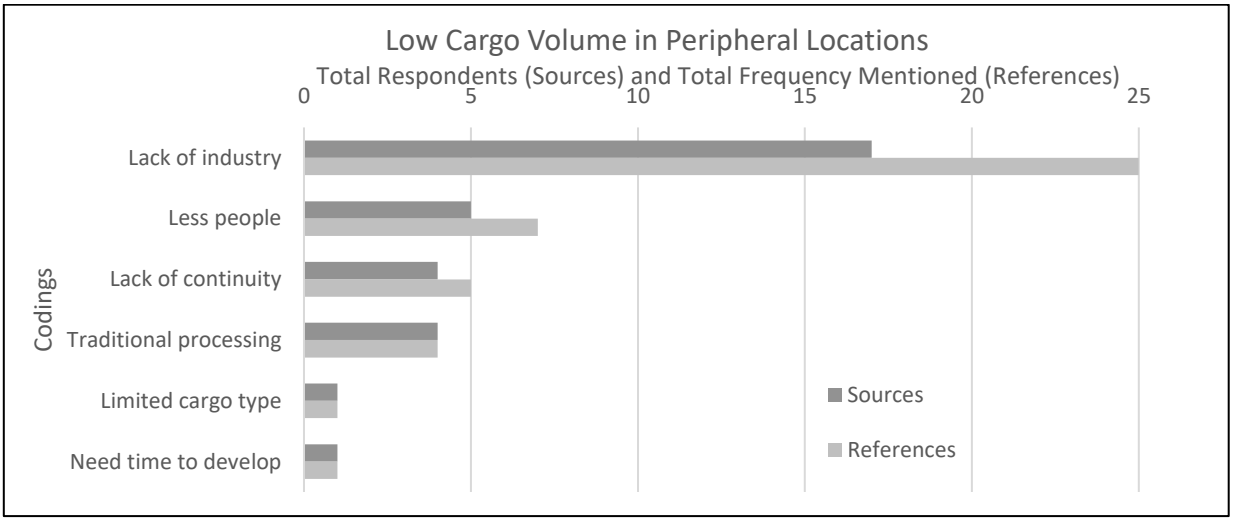
Source: Author

Figure 4.3 Potential Cargoes Peripheral Locations

mentioned by less than 10 sources. A selection of interview quotes on perception of peripheral ports and peripheral location are shown in Appendix 6 Table 1.

Peripherality and Low Cargo Volumes

Perception of peripherality as having low cargo volume was also coded in detail from responses. Within 32 respondents who mentioned peripherality and low cargo volumes, 17 sources added that this is caused because lack of industry. The rest of the responses mentioned because of less people or population, lack of continuity on the cargo and production, having traditional processing for comodities, limited cargo type and the need of time to develop. Figure 4.4 shows the percentage of respondents' perceptions related to low cargo volume.



Source: Author

Figure 4.4 Low Cargo Volume in Peripheral Locations

Perception of Peripherality by Stakeholder Type

Perception of peripherality by stakeholder type is summarised in Table 4.1. Breaking down these codes by their stakeholder type shows that peripherality related to cargo handled, shipping connection and port theme/issue are heavily expressed by port operators, shipping lines, cargo owners and central government. Meanwhile, the rest of the stakeholders had less perception on those issues. Logistics companies perceive it less as shipping connection and others issue. Local government perceive it less as port, economic activities and others issue. Financial institutions perceive it less as cargo handled and shipping connection issue. It is logic that frequency of references from logistics companies and financial instituttions are far below the other stakeholders since total respondents or sources are half the size.

Table 4.1 Perception of Peripherality by Stakeholder Type

Themes	Perception of Peripherality	Frequency of References						
		PO	SL	CO	LC	CG	LG	FI
Cargo Handled	Not enough cargo volume	16	13	10	2	5	2	2
	Imbalanced cargo	5	7	2	2	7	0	1
	Specific cargo type	3	5	9	3	9	2	0
	Not containerised	2	0	0	1	2	1	0
	Small	1	1	2	1	0	0	0
	No supply chain	0	0	1	1	0	0	0
	Total	27	26	24	10	23	5	3
	Symbol	+++	+++	+++	+	+++	+	-
Shipping connection	No connectivity access	9	6	6	3	6	7	1
	No frequent call	1	1	7	1	2	2	0
	Wooden ship *"Perintis"*	4	2	0	0	6	6	0
	No direct call	1	5	6	0	0	0	0
	Outport	0	5	2	0	0	0	0
	Mixed cargo and passenger	0	1	0	0	0	0	0
	Total	15	20	21	4	14	15	1
	Symbol	++	++	+++	-	++	++	-
Port	Government classification	5	4	1	2	18	2	2
	Lack of facilities infrastructure	3	7	4	0	0	0	4
	Feeder ports	4	1	2	2	3	0	2
	Hub dependence	0	6	5	1	0	0	0
	Not profitable	5	0	2	0	2	0	0
	Low Performance of Ports	2	3	0	1	0	0	0
	Supporting	0	0	1	0	0	0	0
	Total	19	21	15	6	23	2	8
	Symbol	++	+++	++	+	+++	-	+
Economic Activities	Java centered development	1	6	9	3	4	0	2
	No Basic infrastructure	0	0	9	3	2	1	1
	High cost	1	4	3	1	2	0	1
	Having Potential	2	4	3	0	1	0	2
	Tourism	0	2	1	1	5	1	1
	Risky	4	1	4	0	1	0	0
	Marginal *"Tertinggal"*	2	1	0	0	1	1	0
	Poverty	0	0	0	0	1	1	0
	Total	10	18	29	8	17	4	7
	Symbol	+	+++	+++	+	+++	-	+
Others	Remote *"Terpencil"*	3	1	3	0	9	1	1
	Not in government focus	3	0	0	1	4	0	2
	Lack of human resource	0	0	5	3	3	1	2
	Distance far	1	1	1	0	1	1	1
	Everywhere	2	0	1	0	1	0	0
	Complicated position	1	1	0	0	0	0	1
	Land availability + affordable	0	0	8	0	0	0	0
	Total	10	3	18	4	18	3	7
	Symbol	+	-	++	-	++	-	+
TOTAL RESPONDENTS		8	8	8	4	9	4	5

Source: Author; +++ for >20 references; ++ for 11 to 20; + for 5 to 10; (-) for <5.
PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

However, Table 4.1 shows which issue are considered less important by each stakeholder. Logistics companies considers shipping conections and others issue as less important because they do not differentiate whether ships they use are direct and subsidised or not. Their aim is to deliver cargo to the customer's nearest port. Financial institutions look at port development as infrastructure investments, just like any other transportation infrastructure, without too much detail on the cargo handled and its shipping connections. This is because they are more concerned to the return on investment. Investments in ports is seen as too large and takes longer pay back period. Meanwhile, local government is less concerned to ports because they see ports in their local areas as the central government's responsibility, and less power from the district or provincial government. More on each stakeholders' perception and willingness to invest in peripheral locaitons will be explained in Chapter 6.

Overall, findings on the perception of peripheral ports is presented in the following Findings Box 4A. Determining which are considered peripheral ports and what not is difficult because the boundary is vague. Main themes or issues that emerge from categorising perception of peripheral ports and peripheral locations are related to cargo handled, shipping connections, the port itself, economic activities and others (geographic, political and human resource). Nevertheless, it can be concluded that peripheral ports are ports which handles domestic cargo, not directly connected to international shipping lines, in more severe conditions they have low port performance, connected by government subsidised ships and not containerised.

Findings Box 4A:
Peripherality can be explained in 5 main themes which are cargo handled, shipping connection, port, economic activities, and others (geography, politics and human resource).

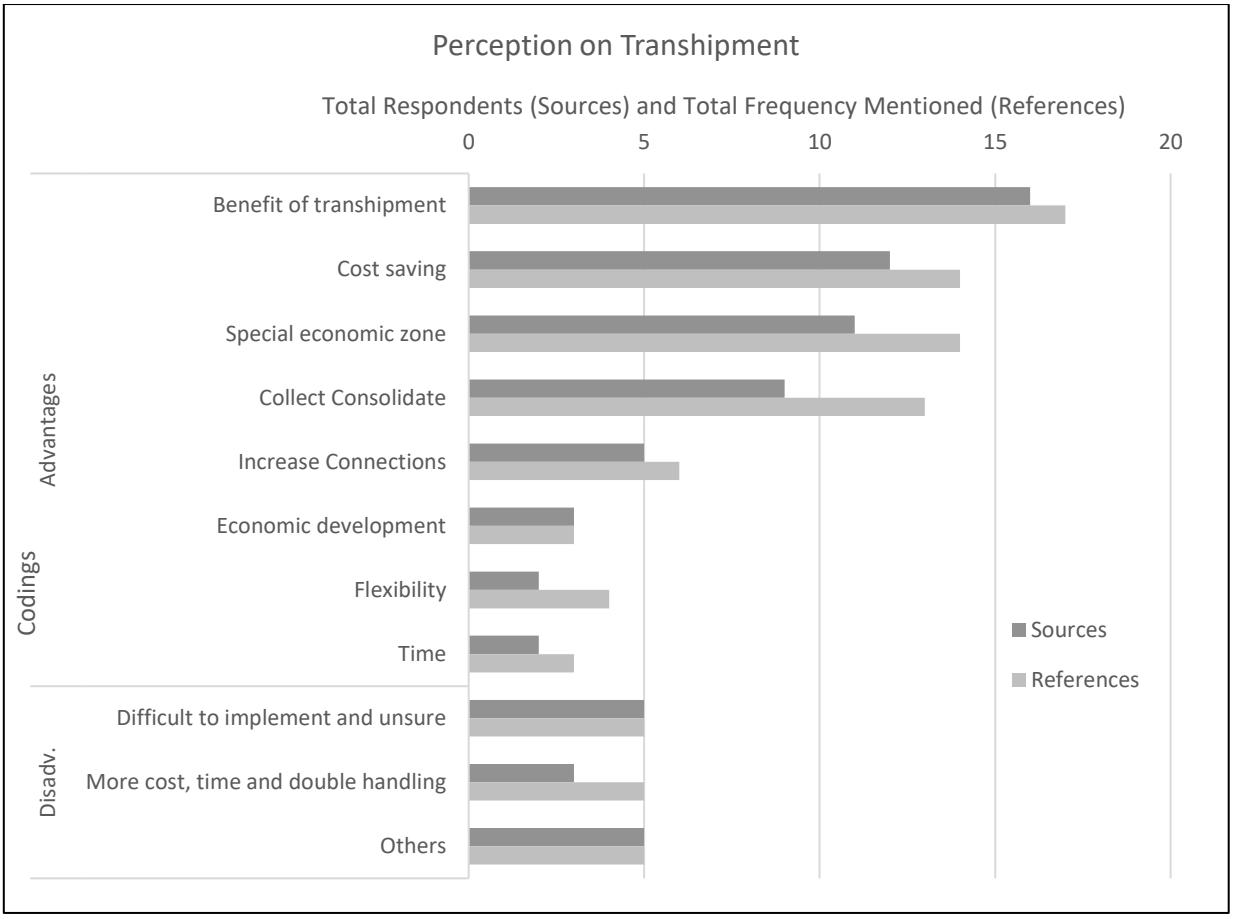
Peripheral ports in Indonesia's maritime transport are ports which handles domestic cargo, not directly connected to international shipping lines, in more severe conditions they have low port performance, connected by government subsidised ships and not containerised.

4.1.2 Transhipment, Critical Facilities and Growth Measurements

Perception on Transhipment

This section is based on the answers to questions related to the benefit of having peripheral port as a hub, transhipment activities and growth measurements. Figure 4.5 shows stakeholders' perception on transhipment. Participants perceived transhipment in general and transhipment activities in peripheral ports, as having benefits. However, they were vague in their explanations as to how it brings benefit. As example, central government participants stated, *"It is beneficial as long as the industries are built/developed and there is more cargo volume" (CG_8 and*

CG_9), and a logistics company participant stated, *"there should be benefit because it is seen that they are starting to develop the special economic zone in Sorong and it will become a hub" (LG_3).*



Source: Author

Figure 4.5 Perception on Transhipment

Some participants are unaware that transhipment activities do not necessarily need industries since the aim of transhipment activities consolidates cargo from different origins and/or to different destinations (see Section 2.3.3). From participants who only confirm that there are benefits without further explanation, it is seen that: 1) they do not fully understand what and how hub and transhipments work. Especially stakeholders who are not directly practitioners in maritime transport activities such as central ad local government officials or financial institutions; 2) very small transhipment operation is conducted in Eastern Indonesia. Participants with more detailed responses expressed their perception on the benefit of transhipment as cost saving, enables special economic zones to be placed, to collect and consolidate, increase connections, contribute to economic development.

On the other hand, participants perceived transhipment as having disadvantages which are: difficult to implement and unsure what hub/transhipment port does (CG_1, SL_3, SL_6, CG_2,

CO_5); leads to more cost, time and double handling (CO_2, CO_6, FS_2); and others. These 'others' responses include disadvantaged because centrality of the particular location is inadequate for transhipment (LG_2), too many hubs leads to high port competition and better to invest in road transport compared to transhipment ports (PO_1), providing transhipment service is not profitable for the port (SL_1), only subsidised ships will take the benefit (SL_2). It shows that direct connctions are more preferred.

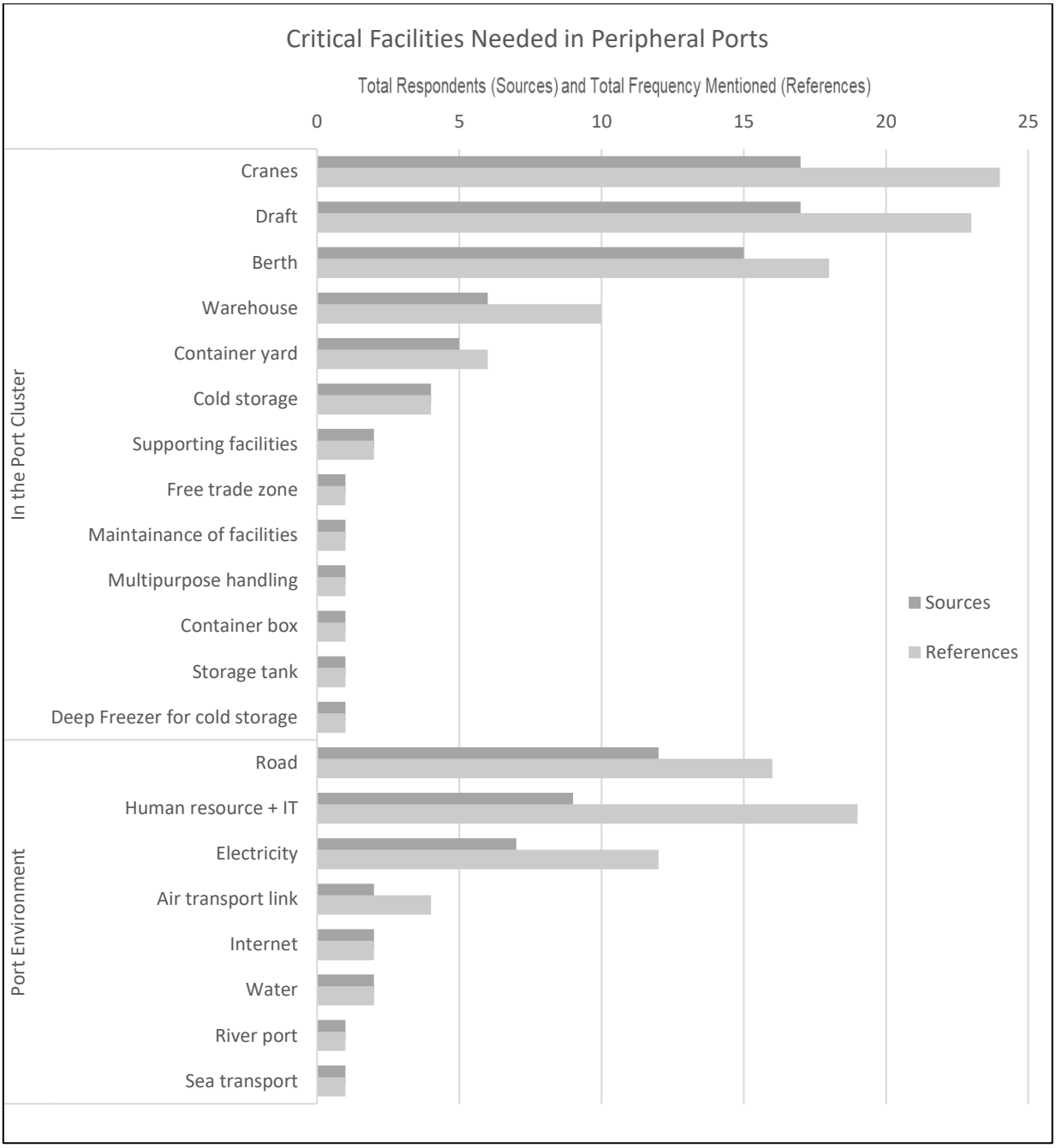
From their overall perception of transhipmen operations, it is seen that they do not trust or are not confident that a peripheral port could do transhipment operations because they stress out that generating new cargo volume and new industries are critical. This means that existing cargo from surrounding small islands and hinterland, which could be feeders of a potential secondary hub, is doubtful or very small. A selection of interview quotes on transhipment are shown in Appendix 6 Table 2.

Critical Facilities for Peripheral Ports to become Hubs

Figure 4.6. details stakeholders' perception on critical facilities. The intention of this question was to understand what is considered a potential peripheral port based on its facilities or what facilities should be added. Participants dominantly answered cranes, draft and berth, which are mentioned by 15 sources and above. Facilities in the port cluster mentioned by less than 10 sources are warehouse, container yard, cold storage, supporting facilities (e.g. to process products), free trade zone, maintenance of facilities, multipurpose handling facilities, container box, storage tank, deep freezer for cold storage.

Meanwhile, there are also responses which are related to the port environment as critical facilities. Participants dominantly answered road transport links, which are mentioned by 12 sources. Facilities in the surrounding port cluster mentioned by less than 10 sources are human resources and IT facilities, electricity, multimodal transport link (air, river and sea), internet, and water.

These responses imply that the basic infrastructure in ports (cranes, draft and berth) are not sufficient in Indonesia's small peripheral ports. An example quotes from a central government respondent stated, *"for locations with a growing number of population, facilities could be upgraded from local feeder to regional feeder, it could be containerised… there are also ports which sould be upgraded in terms of its berth capacity. Hence, before they were not using cranes, now upgraded with cranes" (CG_4).*



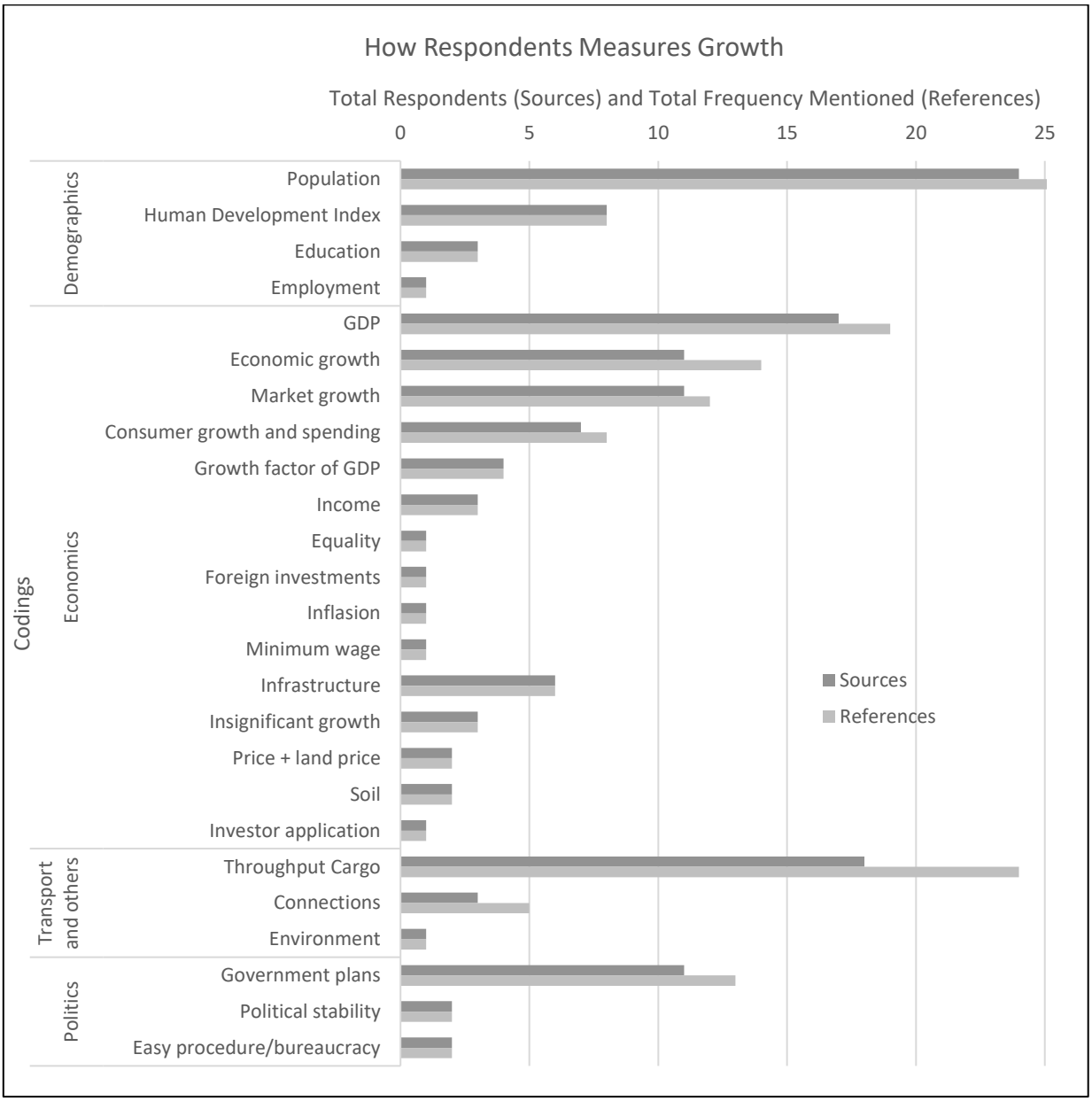
Source: Author

Figure 4.6 Critical Facilities Needed in Peripheral Ports to Become Hub

Growth Measurements

Figure 4.7 details stakeholders' perception on growth measurements. The intention of this question was to understand when a peripheral port or peripheral locations are growing, expanding, able to level-up the port hierarchy or considered less peripheral. Dominantly paricipants use these measurements, respectively from the most frequent: population, throughput cargo, GDP and economic growth, market growth, and government plans. The rest of the codings are mentioned by less than 10 sources.

These findings mean that general and direct measures which are population and port throughput are complemented by indirect measures. Participants also look at indirect and more intangible measures such as GDP, market growth, cosumer growth also government plans. The number of consumers who use their products and services in these peripheral locations are critical. As example an international shipping line participant stated *"To see whether it is successful or not is not only by its inward but also benchmarking with market, how large is the market growing compared to our company growing, that is what we view from port throughput. From port throughput we understand how large it is growing and contracting, compared to how large our company is growing and contracting" (SL_5).*



Source: Author

Figure 4.7 Perception on Growth Measurements

Furthermore, government's plan to develop in peripheral locations also impacts their decision making to expand business in these peripheral locations. Government's plan could be anything mentioned by participants such as building new roads and railways, building new power generators and telecommunication poles, or even distributing health facilities to hospitals in peripheral locations. As example another shipping line participant stated, "*New industries is more related to government's project, because they have the spending money, cargo from Java" (SL_3).* It also shows that stakeholders' value long-term measures because government projects are mostly coming from long-term national planning. A selection of interview quotes on growth measurements are shown in Appendix 6 Table 3.

Overall, findings on transhipment and growth measurements are presented in the following Findings Box 4B. It can be concluded that stakholders perception on transhipment and hub ports are still unsure. There is tendency to use more direct connections and making efforts to generate new cargo and industries. Hub-and-spoke operations in Indonesia's maritime transport seems to be not fully understood, ineffective and cumbersome. Critical facilities needed in peripheral ports are cranes, draft, berth and road transport links. Meanwhile, to measure growth of peripheral ports and peripheral locations, not only direct measures such as population and cargo throughput, but also indirect and long-term measures which are GDP, market growth, consumer growth and government plans.

Findings 4B:
Transhipment operations are ineffective and cumbersome. Direct connections, generating new cargo and industries are more preferred. Critical facilities needed in peripheral ports are cranes, draft, berth and road transport links. Meanwhile, to measure growth in peripheral locations, direct measures (population growth and cargo throughput) and indirect measures (GDP, market growth, consumer growth, government plans) are used.

4.1.3 Perception of Indonesia's Hub and Peripheral Ports

This section addresses questions on how far a location is considered peripheral and any responses related to geographical locations in Indonesia. Findings reveal that locations mentioned could be explained in 3 groups: perceived as a main hub port, potential secondary hub port and Eastern Indonesia's peripheral ports.

Perceived Hub Ports

Participants perceive Jakarta (Tanjung Priok, 63 references) and Surabaya (Tanjung Perak, 58 references) as the main hub ports in Indonesia, mainly because they conduct the largest percentage of transhipment operations and handle the largest volume of international cargo compared to other ports. As example, an international shipping line respondent stressed that *"If*

you look at Indonesia today, traditionally Indonesia have been working on 2 hub ports, Jakarta and Surabaya (SL_1)." Perceived hub ports are followed by Makassar (25 references); Belawan (Medan, 13 references); Semarang (9 references) and Bitung (6 references).

Jakarta, Surabaya, Belawan and Makassar are indeed perceived as hub ports because they are the largest ports representing the 4 main port operators in Indonesia. For Semarang, it is one of the largest city in Java Island, the capital of Central Java. Moreover, Bitung is a growing port located 1 hour from Manado (Capital city of North Sulawesi), which is supported financially and marketed by the central government as it is written in the The National Logistics Development Blueprint (see Figure 3.18 in Section 3.3.2). Furthermore, perceived hubs located outside of Indonesia most frequently mentioned are: Singapore (37 references); Tanjung Pelepas (9 references), Davao-Phillipines (7 references) and Hong Kong (6 references). The rest are mentioned by less than 3 references. These perceived hub ports are shown in Figure 4.8. The size of the circles on the map represents how frequent each location is mentioned.

Perceived Potential Secondary Hub Ports

Next, participants perceive the following ports as potential secondary hub ports, respectively from the most frequently referenced or mentioned: Sorong (48 references); Bitung (38 references); Ambon (22 references); Makassar (21 references); and Jayapura (12 references). They are located in Eastern Indonesia. They are considered as potential secondary hub because they are either capital of a province or a populated city. The rest are mentioned by less than 12 references mostly located in Sumatera Island in the Western part of Indonesia and some in the central part, which are: Kuala Tanjung, Panjang, Belawan, Dumai, Palembang, Kupang, Manado, Banjarmasin, Batam, Pontianak, Palu, Pekanbaru and Perawang.

Potential secondary hub ports are expected to have a rising volume of cargo and predicted able to reduce its dependency to Jakarta by having direct connections to international hub ports such as Singapore and Hong Kong. As example, quote from a shipping line respondent stated *"Our average weekly sales could reach 400 to 500 TEUs from outports. Either Perawang to Jambi direct to Singapore. Panjang also direct to Singapore. We are trying to make Panjang transit through Jakarta, Palembang transit through Jakarta, why? Because frequent feeders from Palembang to Singapure is limited by draft issues" (SL_8).* Another example is a logistics company respondent who is actively involved in the government's national port masterplan and logistics documents expressed his optimism that Bitung and Kuala Tanjung are potential secondary hub ports. He specified as follows, *"We are optimist that in 2021 the hub Kuala*

Tanjung dan Bitung will be completed and will become international ports, hence we do not need Singapore anymore" (LC_3). These perceived secondary hub ports are described in Figure 4.9.

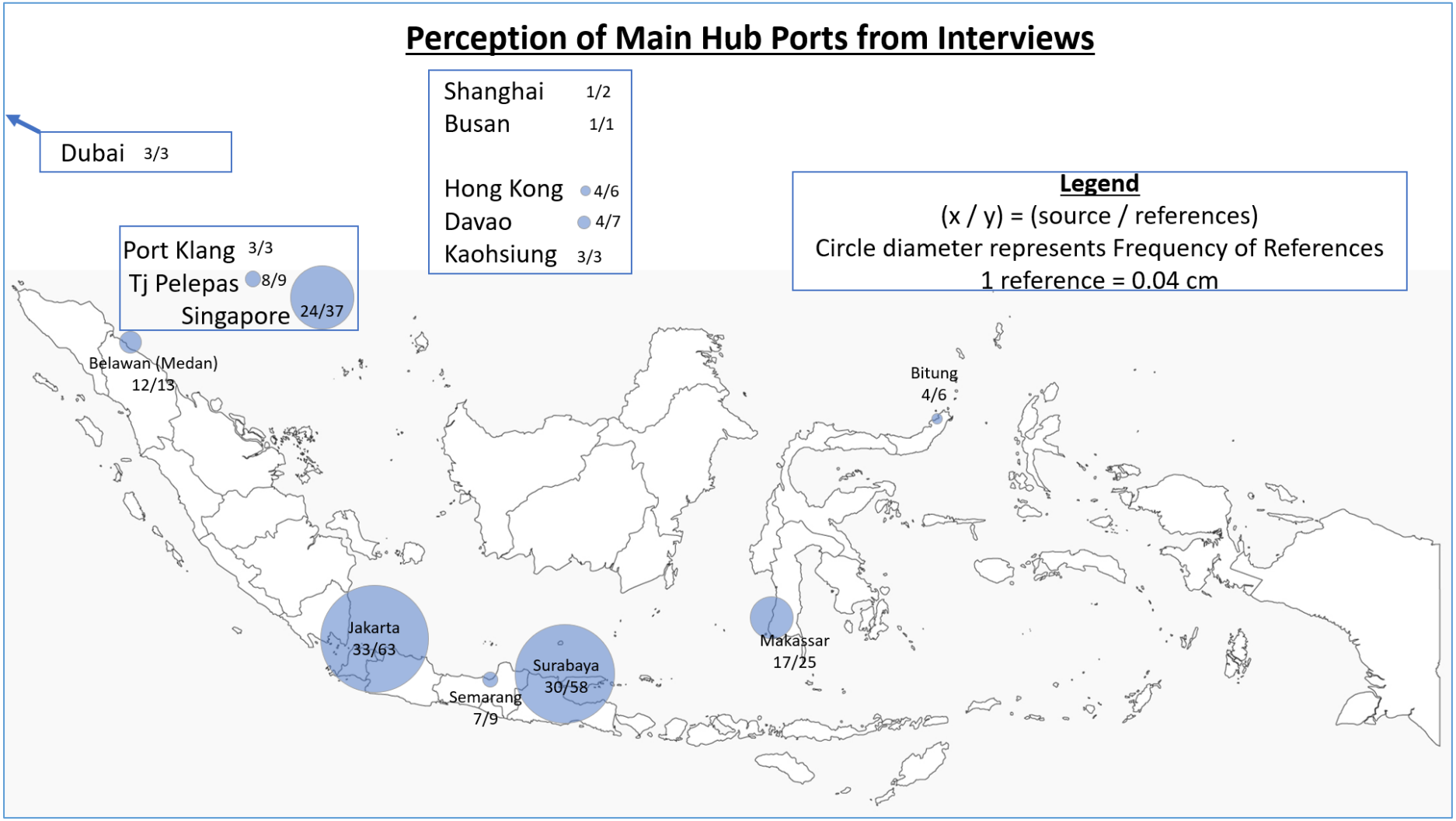
Perceived Peripheral Ports

Finally, participants perceive the following ports as peripheral ports: Amamapare Timika (5 references), Sorong (4 references), Nabire (4 references), Manokwari (4 references) and Jayapura (4 references). The rest are mentioned by less than 4 references, which are: Ambon, Banda Naira, Dobo, Morotai, Namlea, Rote, Tobelo, Tual, Agats, Babo Bintuni, Biak, Fak Fak, Kaimana, Merauke, and Toli Toli. They are located in Eastern Indonesia.

These locations are mentioned as peripheral because they have significant population centres in regency level, have special features, and mostly dependent on Surabaya. As example, Manokwari is critical since it is appointed to become the capital of the newly province West Papua in 2007, Amamapare Timika is known as the location of a huge international mining company, and Nabire is one of the top 5 population centres. As example, a local government explained *"There is direct connection from Surabaya direct to Amamapare… also to Nabire, cargoes in Nabire are like rice, basic daily needs such as sugar, coffee, tissue, they are usually from Surabaya" (LG_3).* Perceived peripheral ports also have characteristics of peripheral ports as described in the interview codings (Section 5.1.1). As example, a port operator explained that Fak-Fak port has low performanc as follows: *"Main characteristics is having limited activities. For example, Fak Fak is class-4, activities there are very limited, operations are only 5pm, not 24 hours. We can have them operate 24-hour, but the cost would be very expensive" (PO_7).* These perceived peripheral hub ports are shown in Figure 4.10.

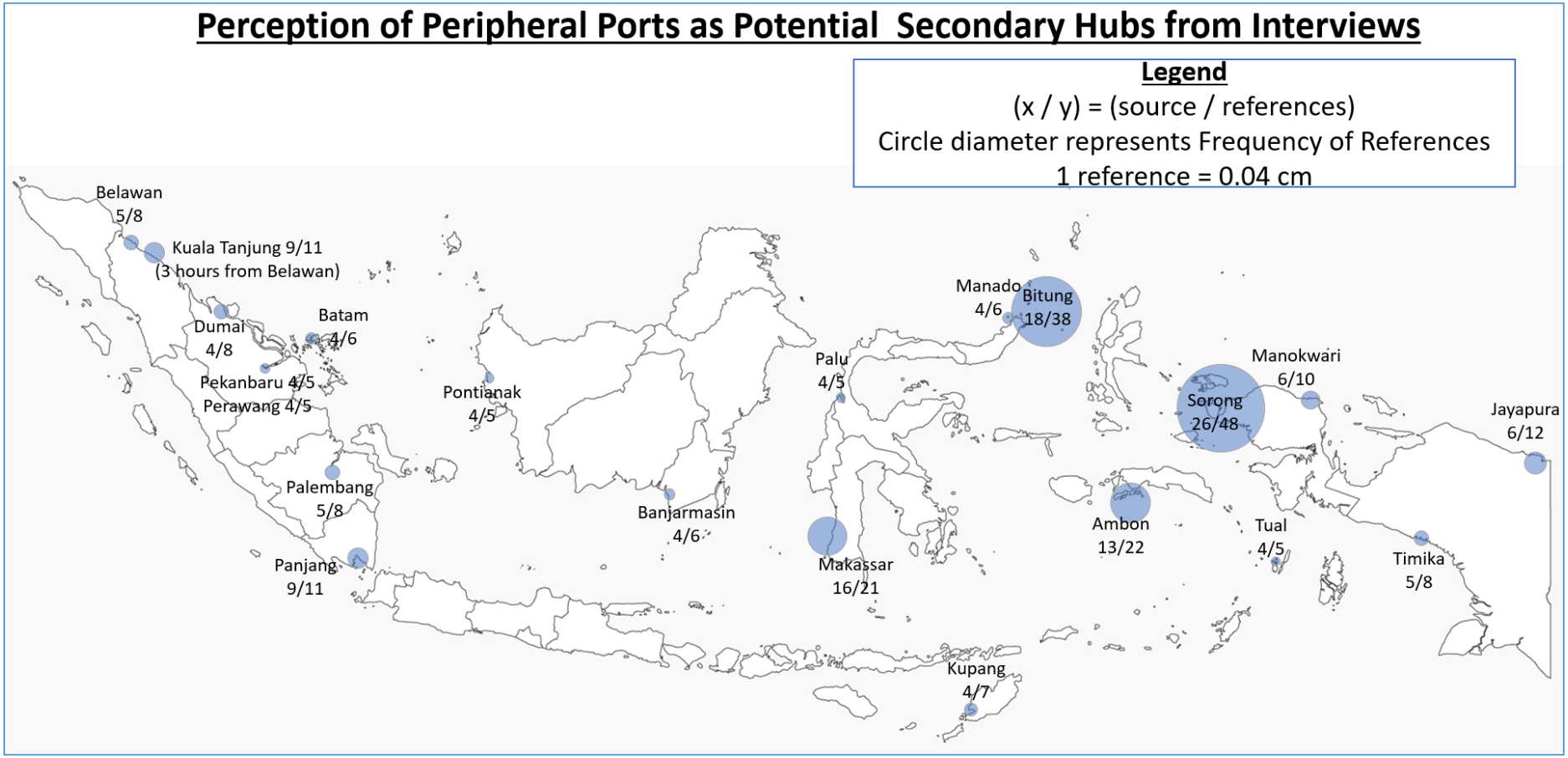
Not a Peripheral Port, Not Yet a Hub

This reminds the author of a song in her childhood memories, *"I'm not a girl, not yet a woman"* by Britney Spears, released in 2001. From previous explanations on perceived hub-peripheral ports, it is seen that there are ports perceived in both main hub and potential secondary hub, which are Belawan, Makassar, and Bitung. These ports could be labeled as 'not a secondary hub, not yet a hub'. Furthermore, there are ports perceived in both potential secondary hub and peripheral port which are Sorong, Jayapura, Manokwari, Ambon, Timika, Tual, Kupang/Rote. These ports could be labeled as 'not a peripheral, not yet a secondary hub'. It shows that there are ports which is perceived in between the perceived hierarchy level and each of them could also be perceived differently by different respondents.



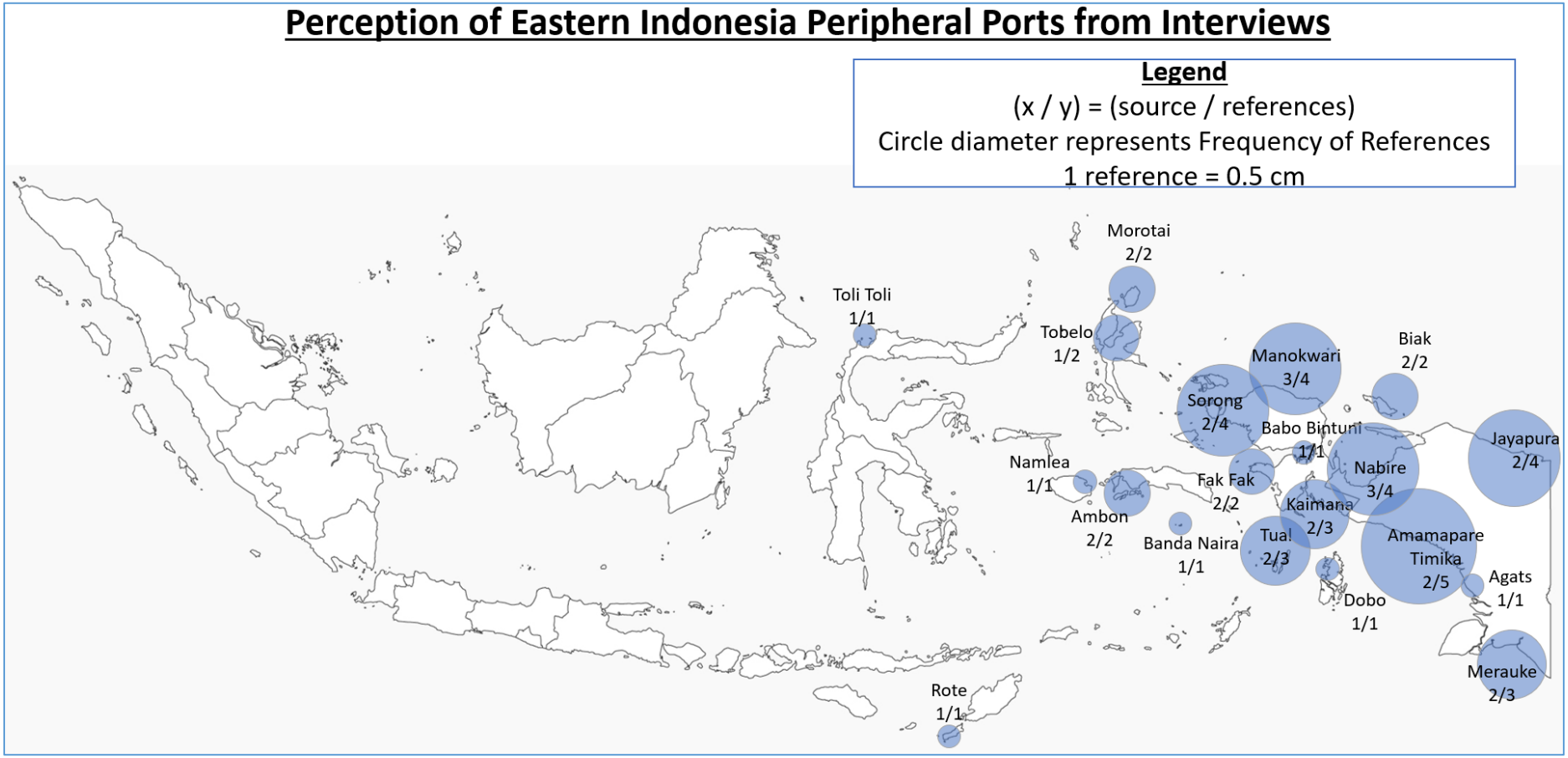
Source: Author

Figure 4.8 Perception of Main Hub Ports from Interviews



Source: Author

Figure 4.9 Perception of Peripheral Ports as Potential Secondary Hubs from Interviews



Source: Author

Figure 4.10 Perception of Eastern Indonesia's Peripheral Ports

This finding confounded our understanding. However, it shows that it is difficult to get a clear cut on where each port is positioned in a port hierarchy. It is also a sign that port hierarchy could change. In order to serve more peripheral ports and load more cargo, domestic shipping lines combines these peripheral locations like a loop. As example, Sorong, Nabire and Ambon are considered 'not a peripheral' because it has a substantial cargo volume, however, 'not yet a secondary hub' because it is dependent to Surabaya. A shipping line respondent stated *"Nabire has a big potential because it distributes cargo to a couple of regencies, around 9 regencies. We put them together in the route so one-way we serve Sorong-Manokwari-Nabire-Serui-Biak, we serve close ones. One ship is unloads not much cargo, 50-75, but it is full… So the ship spins around the northern part of Papua… then it goes back to Surabaya. We also want Ambon to become one of our hub, however, they do not have sufficient facility as a hub" (SL_7).*

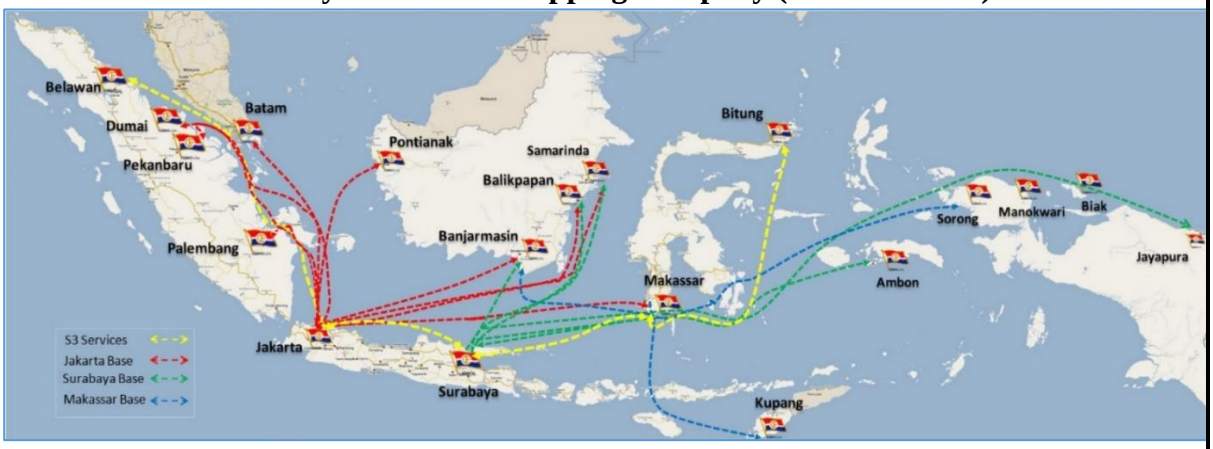
Other supporting information is that the Indonesian Navy are currently developing of a new naval hub in Sorong. This shows the importance of Sorong and the increasing significance of Eastern Indonesia. Previously, Indonesian Navy devides Indonesia's sea territory into two large areas: The West (based in Jakarta) and the East (based in Makassar). Sorong is built as a new naval hub because of its centrality location to protect and control the Eastern Indonesian waters. A central government official stated, *"Why was it before divided into two? Because before the eastern is overlooked, their development is always left behind compared the western part. From Sulawesi to the east, to Papua, is less noticed…" (CG_3).* One of the issue to increase security guards in Eastern Indonesia's waters is illegal fishing (mentioned by 8 sources, 13 references). Codings on this issue will be discussed more detailed in Chapter 6. The same central government official explained about illegal fishing as follows: *"Ambon gulf is one of the location having lots of illegal fishing, particularly in Aru sea and Arafuru sea, the centre of illegal fishing by ships from xx, yy, zz, now we have eradicated them. They operate in the Exclusive Economic Zone borders with Australia. If our ships come it is secure, but they will enter again when we leave" (CG_3).*

Aside from interview results, secondary data explaining routes provided by domestic shipping lines also brings insight on how the 3 level, hub-secondary hub-peripheral port, is established. It is shown in domestic shipping companies' websites. Names of the companies are concealed to ensure ethical issues on anonymity. Surabaya is the dominant port in which peripheral Eastern Indonesian ports are dependent on and this is currently followed in second place by Makassar. For instances, domestic shipping line A already has direct service from Makassar to Banjarmasin, Kupang, and Sorong. Line B has more direct services from Makassar which are to Ambon, Bitung, Gorontalo, Jayapura, Kendari, Luwuk, Manokwari, and Nabire. However, line C has

newly direct services from Makassar only to Banjarmasin dan Balikpapan. Hence, it is seen how the dependent hub is showing a trend moving from Surabaya to Makassar eventhough different companies might have different focus on their service. Figure 4.11 depicts two domestic shipping line's route, one from the private sector and the other from a state-owned company. Both shows that Surabaya and Makassar are currently the hub for connections to Eastern Indonesian ports. Hence, this shows that a change in the port hierarchy is possible. Overall, findings on identifying Indonesia's hub and peripheral ports are presented in the following Findings Box 4C.

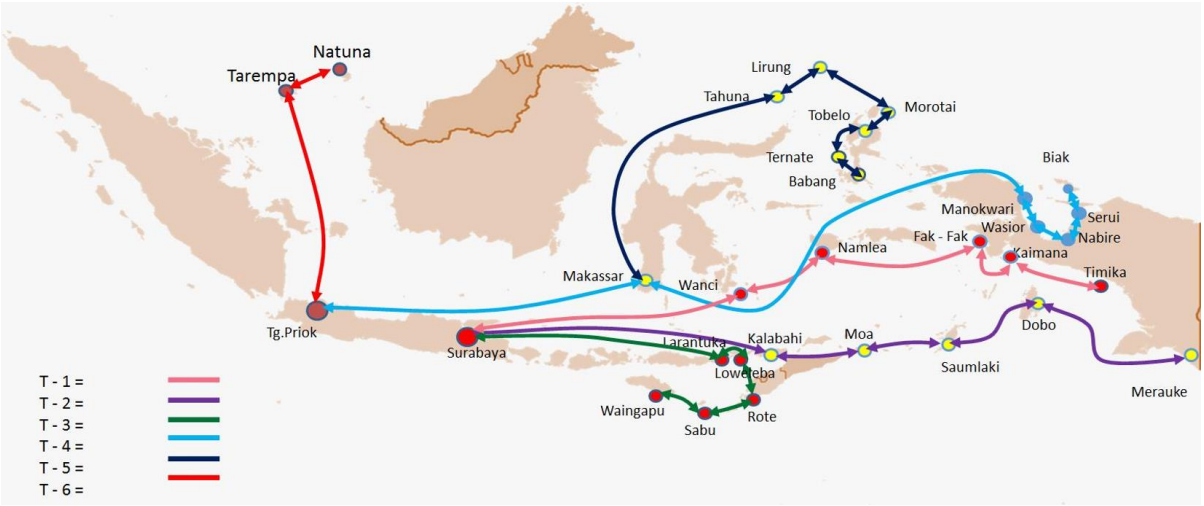
Findings 4C:
Indonesia's largest hub are Jakarta and Surabaya. Main Hub to eastern Indonesia is still Surabaya. However, it is seen that Makassar is starting to follow Surabaya's position.

Routes by a Domestic Shipping Company (Private Sector)



Source: XX Domestic Shipping Line Company (2017)

Routes by State-Owned Shipping Company



Source: PT Pelni (2016)

Figure 4.11 Examples of Shipping Route of Indonesian Domestic Shipping Line

4.2 Discussion

There are 4 main points to be discussed related to peripherality in Indonesia's maritime transport sector, as a result of comparing findings from main interviews with relevant literature. The following Table 4.2 compiles a summary of findings (from boxes 4A to 4C), relevant literature and discussion points. Items in the 'Findings' and 'Relevant Literature' columns are the basic premise to build arguments in 'Discussions' column.

Table 4.2 Findings, Relevant Literature and Discussions in Chapter 5

Findings	Relevant Literature	Discussions
Findings 4A Peripherality can be explained in 5 main themes which are cargo handled, shipping connection, port, economic activities, and others (geography, politics, human resource). Peripheral ports in Indonesia's maritime transport are ports which handles domestic cargo, not directly connected to international shipping lines, in more severe conditions they have low port performance, connected by government subsidised ships and not containerised. **Findings 4B** Transhipment operations are ineffective and cumbersome. Direct connections, generating new cargo and industries are more preferred. Critical facilities needed in peripheral ports are cranes, draft, berth and road transport links. Meanwhile to measure growth in peripheral locations, direct measures (population growth and cargo throughput) and indirect measures (GDP, market growth, consumer growth, and government plans) are used. **Findings 4C** Indonesia's largest hub are Jakarta and Surabaya. Main Hub to eastern Indonesia is still Surabaya. However, it is seen that Makassar is starting to follow Surabaya's position.	1.5 Research context on Indonesia; 2.1.1 Definitions of peripherality and peripheral port; 2.1.2 Advantages and disadvantages of peripherality; 2.1.3 Development of peripheral ports; 2.1.4 Transport development models and port hierarchy; 2.1.5 Peripheral port challenge; 2.1.6 Rise of secondary hub ports and direct call of shipping lines; 2.2.3 Transhipment operations; 2.2.4 Maritime network 2.3.1 Stakeholders in Maritime Economics; 2.4.3 Selection of most related studies and variables.	5.3.1 Peripherality as a cycle and how to break the cycle: generate cargo, explore new market, shifting hubs, develop hubs, increase economic activities. 5.3.2 Peripheral port development in an archipelago country: port hierarchy mapping and identify division of tasks. 5.3.3 Peripherality as aspatial issue: political issue and human capacity issue. 5.3.4 Maritime transport development and path dependence: Emerging secondary hubs to locations with emerging economic growth.

Source: Author

4.2.1 Peripherality as a Cycle and How to Break the Cycle

This discussion argues that peripherality is a cycle and the strategy to break out of the cycle is by creating conditions for an upward spiral.

Peripherality as a Cycle

It is understood from literature reviewed in Chapter 2 the definitions of peripherality and peripheral port (Section 2.1.1), advantages and disadvantages of peripherality (Section 2.1.2) and development of peripheral ports (Section 2.1.3). Findings from interview results represented by data codings shows that there are 5 main themes to explain peripherality (Section 4.1.1).

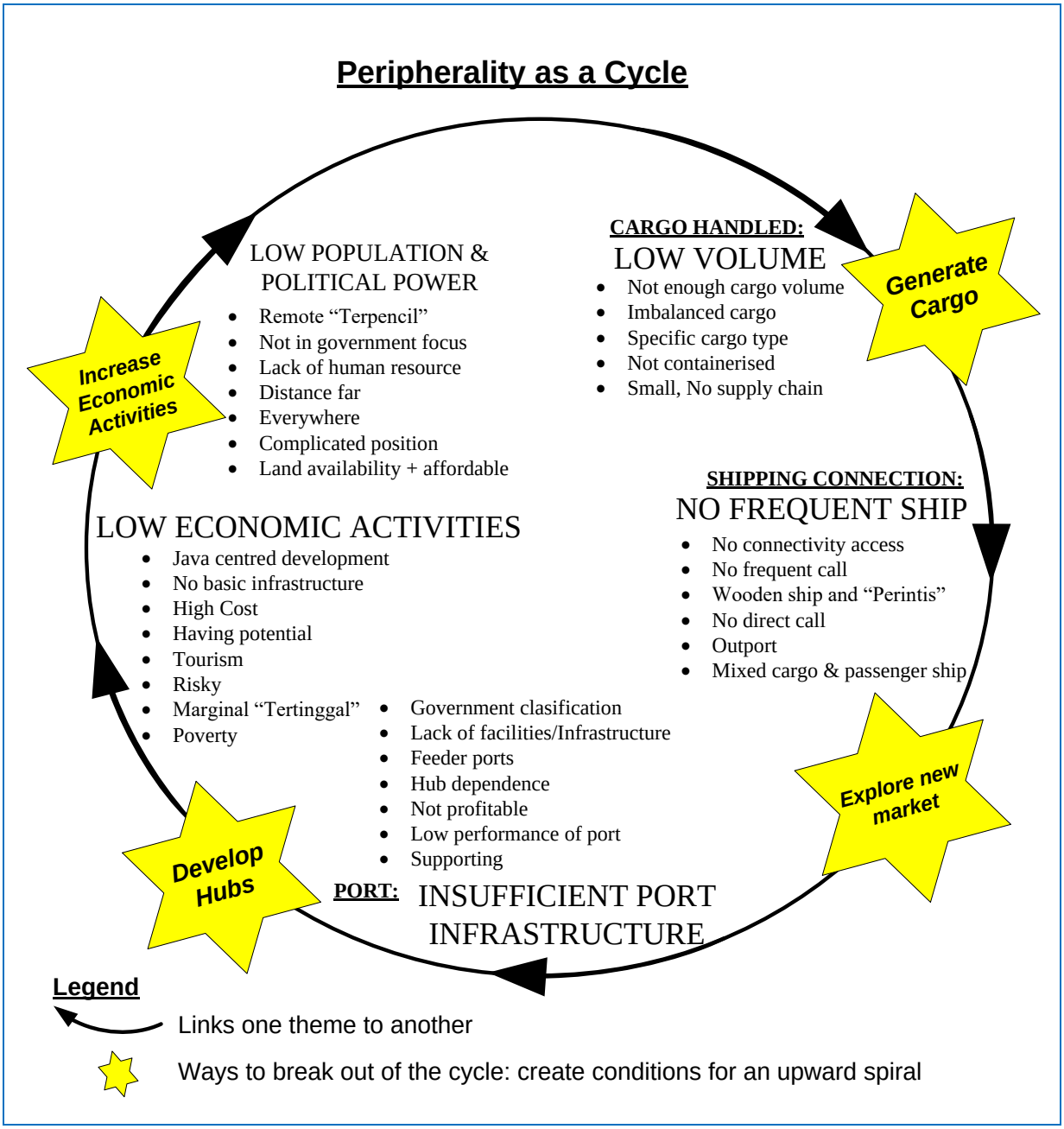
These themes are cargo handled, shipping connection, port, economic activities, and others (related to geography and politics). The codes and coding themes confirm the characteristics of peripheral locations and peripheral ports from literature.

Furthermore, this leads to new insights which are not yet identified in the literature. It is complicated to understand how these 5 coding themes relates with each other, whether it affects each other, or which comes first after one another. This is identified from a couple of respondents saying that there is a 'chicken and egg' analogy, where respondents are unsure which issue comes first. As example, a shipping line respondent stated that *"from a potential point of view, peripheral locations are important, but we need to consider it first, like chicken and egg, there is a huge potential, but no one is coming in yet because connectivity is not yet established" (SL_5).* Another respondent from a cargo owner background also stated that *"If we want to build a smelter, there needs to be a port and large supply of electricity. Its chicken and egg, you see. Electricity supplier and Pelindo port say that they will build facilities if there are investors. Investors also say they will support investing if there are electricity and ports available. So, who will start first" (CO_3).*

Interviews results reveal that the literature is fragmented. If they are seen in a bigger picture, it can be seen as a cycle. It is also found in literature by Nutley (1998) that road transportation issue in rural regions in the UK is described in a 'viscious cycle'. Nutley (1998, p.188) explained that a rise in car ownership and usage leads to reduced market for public transport, bus companies make losses, reduced frequency of service, poorer quality of public transport service, increased utility of car ownership, and back to increasing car ownership. Hence, a similar logic is adopted to the 5 main themes. Peripheral locations with low cargo volume leads to low shipping connections, which leads to low port performance and infrastructure, low economic activities, low population and political power, and returns to low volume. The links between these 5 coding themes in a cycle are supported by both literature and interview quotes, summarised in Appendix 6 Table 4. Peripherality as a cycle are shown in Figure 4.12. More specifically it is described as an upward spiral, with the yellow star symbols representing ways to break out of the viscious cycle. The following are explanations for each link.

First, on the link between low volume and low shipping connections. Manufacturers in a peripheral location, with relatively small industrial base and local market is disadvantaged with low direct freight services and inadequate quality of transport services (McKinnon 1992). Peripherality becomes worse with the advancement of innovations in transport, only the large

cities or large hubs are connected (Knowles 2006). Moreover, low volume or low throughput ports are not selected by main shipping lines and less important for the maritime network (Hayuth 1981; Dunbar-Nobes 1984; Mangan and Cunningham 2000; Wang and Slack 2004; Bryan et al 2006; various research compiled in Section 3.3.1). An example interview quote supporting this is a shipping line's statement, *"The volume is not there yet. If volume is enough, we can use our ship directly without using local players… There was a problem with the fisheries industry and makes exports weaker. It is not enough for us to continue our direct call from Bitung, so we decided to stop the direct call 1.5 years ago." (SL_5).*



Source: Author

Figure 4.12 Peripherality as a Cycle

Second, on the link between low shipping connection and insufficient port infrastructure. Being feeders at the lowest level of the port hierarchy is based on low efficiency per cost (Robinson 1998). Port tangible aspects such as hard infrastructure and facilities, also intangible aspects such as port efficiency and performance are needed to attract shipping lines (various research compiled in Section 3.3.1). An example interview quote supporting this is a port operator's statement, *"Criteria to upgrade its status from feeder ports (pengumpan) to collector ports (pengumpul) is definitely upgrading facilities, and facilities could be completed if there is demand" (PO_2)*.

Third, on the link between insufficient port infrastructure and low economic activities. Peripheral port is known to have less bargaining power (Heaver et al 2005). A core-periphery pattern is a result of economies of scale, transportation costs and manufacturing's share in a national income (Krugman 1991b). Moreover, in Port Economic Impact studies, it is well accepted that port's activities contribute to economic impact such as economic growth and employment (various studies compiled in Section 2.1.3). An example interview quote supporting this is a central government's statement, *"Our gap/inequality from east, west, north, south, cities, villages, also in income distribution. If we analyse it, development centres are still in Western of Indonesia, especially in Java. Remote areas should be built as strategic economic activities. Because of the topography and archipelagic nature, hence, transport sector is critical to be developed. Transport is becoming significant barriers for development to go there" (CG_2).*

Fourth, on the link between low economic activities and low population and political power. Location is considered in political-economic processes (Swyngedouw 1992); economical peripherality leads to spatial peripherality (Erkut and Ozgen 2003) and there are aspatial aspects related to peripherality (Copus 2001) as explained in Section 2.1.1 and Section 2.1.2. An example interview quote supporting this is a port operator's statement, *"The driving force is do you have a good chunk of population there. If there are no people living, very little economic activities. Population is very important. Secondly is the concentration of industries around the area. That will be the driving force to attract more cargoes, coming in and out" (PO_1).*

Lastly, on the link between low population and political power with low volume and low connectivity, which creates the final link of the cycle. Peripherality is defined as remoteness and inaccessibility to transport network, market, economic and population centres (Langholm 1991; Ball 1996; Copus 2001; Bickerstaff et al 2006) as explained in Section 2.1.2 and Section 2.1.3. Weak influence on governance, low rates of innovation/entrepreneurship, are associated

with poor local and inter-regional infrastructure, sparsity of population and dependence on primary industries (Copus 2001). Hence, cargo are low compared to cities or urban centres, either cargo coming in (for consumption) and out (low production). An example interview quote supporting this is a cargo owner's statement, *"From demand perspective each year there is rising growth. If the population growth is increasing, automatically consumers are also rising. If population growth of 10% then consumer growth is usually 3-5%" (CO_7).* Hence, location with low population and political power eventually leads back to low cargo volume.

How to Break the Cycle

In addition to peripherality as a cycle, this discussion also argue the strategies to break out of the cycle is by creating conditions for an upward spiral. As shown in Figure 4.12, there are 4 stars to represent these strategies, which are: generate cargo, explore new market, develop hubs and increase economic activities. These strategies answer the 5 coding themes which explain peripherality.

First, on generating cargo volume. This strategy is more specific for cargo owners, local residents, entrepreneurs, local government and central government. Peripheral ports as having low cargo volume is identified in the literature such as having cargo volume below 300 million tons, dominantly not containerised and driven by domestic cargo (Feng and Notteboom 2013). The Small Island Developing States (SIDS) as a terminology by UNCTAD (2014) are even named after its main characteristics of being 'small' in volume and population. Other literature reviewed in Section 2.1.3, on the development of peripheral ports are related with low cargo volume.

It is confirmed in this study (findings in Section 4.1.1) that port peripherality is mostly perceived by respondents as having low cargo volume and that they suggest Eastern Indonesia to generate more cargo. They believe that boosting cargo volume can be done by creating more industries in the Eastern region, starting from specific or niche cargo such as fisheries, coconuts, bananas or having more development using cement (Section 4.1.1). Results shows that generating cargo volume is more critical than conducting transhipment operations, eventhough doing transhipment itself means consolidating cargoes from surrounding islands (Section 4.1.2). More preferred are cargo for international trade or for export commodities (more detailed to be explained in Section 5.1.2).

This shows that in an archipelagic country like Indonesia, specifically in Eastern Indonesia, the case of Singapore to become a large transhipment port without significant size of hinterland is

not feasible. One of the respondents from a funding institution, FS_2, had a unique way of seeing it. He explained generating cargo volume as 'formalising/preparing the feeders' before providing transport links to open the market. The following are his explanations: *"What is fundamental besides building these ports is finding the way for Eastern Indonesia itself to generate cargo. Because you have the Indonesian phrase "dimana ada gula ada semut", meaning "where there is sugar, there is ants". As long as you have cargo, shipping will take place… Creating cargo is more difficult. But connectivity you can (create), you can subsidize it for a while, 'tol laut' (subsidised shipping programme by the government) currently shows that. That is an option…. So being a hub, its not so much being the hub but how you formalize the spoke. How do you get containers to these regions, what are you going to fill these containers and how much influence do you have" (FI_2).* Hence, the first step to break out of the peripherality cycle is by generating cargo volume in the peripheral locations.

Second, on exploring new markets. This second strategy is more specific for the shipping lines and transport service providers. The logic here is that after the cargo is available, ships will come. The peripheral port challenge and the rise of secondary hub ports are phenomenas widely known in the maritime transport literature (Section 2.1.5 and Section 2.1.6). Exploring new market means the emergence of new direct connections (Section 2.2.3) and creating a change in centrality-intermediacy (Section 2.2.4). Exploring new market is aligned with the work by Ducruet et al. (2009b) that there is a shift from concentration to deconcentration studies (Section 2.4.3).

It is confirmed in this study that Jakarta is challenging Singapore, Surabaya is challenging Jakarta, Makassar (and other potential secondary hub ports) are challenging Surabaya as Eastern Indonesia's current hub (Section 4.1.3). However, this process takes a long period of time. It can be argued that peripheral ports not only are dependent on a large hub port (Ducruet et al. 2009b), it is seen here that there is an inertia to shift from the current large hub ports, Jakarta and Surabaya. There is a locked-in effect. Hence, exploring new market to shift from the current hub is needed to go further to the Eastern part of Indonesia. Moreover, findings show that if cargoes are available, shipping lines and other transport service providers are interested to explore new markets or new locations (Section 4.1.1). Either to peripheral locations with a remarkable growth in GDP, in population, in cargo throughput or increasing in the focus of the government's national development planning (Section 4.1.2).

Third, on developing hubs. This third strategy is more specific for the port operators, port authorities or governments as the dominant owner and regulator. Developing hubs means upgrading infrastructure and enabling more transhipment activities to consolidate cargo from surrounding islands. Literature on development of peripheral ports in Section 2.1.3 has been reviewed, either in the SIDS, in developing countries or developed countries. In the case of Ireland, which is considered the periphery of Europe, peripheral ports could be improved by upgrading transport infrastructure and advanced/ best logistics practices (Hannigan and Mangan 2001). There is a risk of over-investment, however, infrastructure upgrade is inevitable to catch up with growth of trade and population, as in the case of the Pacific nations in Dunbar-Nobes (1984). Development of new load centres, consolidation, intermodal facilities, and strategies of transnational operator leads to port deconcentration (Section 2.4.3 on concentration-deconcentration factors).

It was confirmed in this study that developing hubs and its infrastructure is needed and expected by respondents. This is represented by the interview codings on lack of port facilities and infrastructure (findings Sections 4.1.1 and 4.1.2). It could be argued that developing the hub as the port's part and exploring new market as the shipping's part could be done in parallel. However, it is proposed here that developing the hub comes after exploring new market and new direct shipping connections because ports have higher inertia to expand business than shipping lines. Shipping lines has more flexibility to alter or modify their routes, while ports' assets are fixed in nature (more on this in Chapter 7 on stakeholder willingness). As example, is the case of an international shipping company providing new direct service to Bitung for only a short while and did not continue this service because of not having enough cargo volume (explained by SL_1, SL_5, LC_2). An international port operator respondent confirmed that as follows: *"But the port is the infrastructure, once you are in, its hard to get sell and exit to other places, its impossible. Due to the huge amount of money invested. This infrastructure has to have long long payback period. Only government can, not private" (PO_1).* More on reducing the risk of over-investment is discussed in the next section.

Fourth, on increasing economic activities. This third strategy means that increasing economic activities generates cargo volume in a larger scale. It also means making the three previous strategies to work and includes all relevant stakeholders, not specific on any party. Location factors and institutional factors should be created to support trade and economic growth in a faster speed (Section 2.1.5). The 'China effect' as an example case (explained in Appendix 1) should be emulated in Eastern Indonesia.

Overall, these four strategies to break out of the peripherality cycle confirms the liner shipping network configuration model by Wilmsmeier and Notteboom (2011) - explained in Section 2.1.6. It is also aligned with the work of Fremont and Soppe (2007) that there is an imitation of strategies by other actors in the chain to preserve equilibrium. Ports are impacted through concentration and deconcentration of cargo in the hub and secondary hubs chosen by shipping lines. Port concentration occurs when more cargo is consolidated in hubs, while deconcentration occurs when secondary hubs appear. Hence, it shows that efforts to increase economic activities and to break out of the peripherality cycle means to manage port concentration and deconcentration. Table 4.3 describes the alignment of Wilmsmeier and Notteboom's model (2011) with reccuring process of port concentration-deconcentration on the bottom of the table.

4.2.2 Peripheral Port Development in an Archipelago Country: Port Hierarchy Mapping

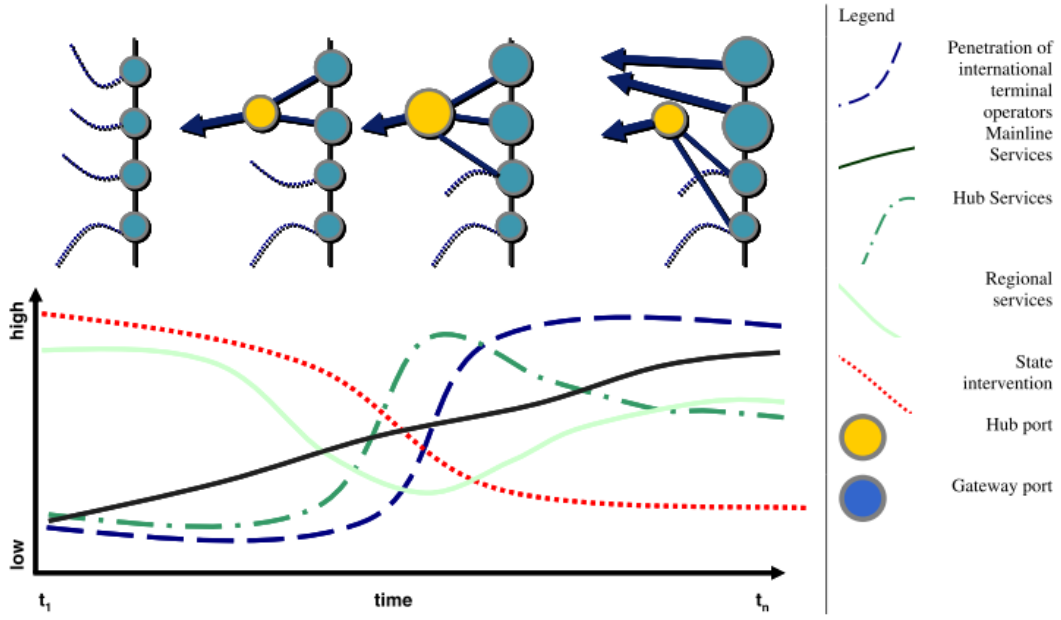
This discussion argues the strategies for peripheral port development, more specifically in an archipelago country. Strategies to break out of the peripherality cycle in previous discussions are suggested for peripheral ports in general. However, for archipelago countries as represented by Indonesia in this study, additional considerations are required which is to map the port hierarchy mapping.

It is understood from the literature that transhipment operations are beneficial since it is more efficient for shipping lines and more reliable for cargo owners if frequency is high enough (Section 2.2.3). Determining a hub location should consider less diversion distance from main shipping routes and having a good distance to surrounding feeder ports (Notteboom 2005; Baird 2006), as explained in Section 2.1.5. Moreover, development of ports in peripheral locations are risky, overshadowed by over-capacity and over-investment, and competition with surrounding small islands (Dunbar-Nobes 1984), due to its nature as explained in Section 2.1.3. Not all peripheral ports could be upgraded at once.

Interview results support the related literature. Findings shows that the challenges in peripheral port development from literature is similar with Indonesia's case (Section 4.1.1). Furthermore, this leads to new insights since transhipment activities in Eastern Indonesia is low, volume of cargo from surrounding islands of the ports are low and stakeholders tend to favour direct services (Section 4.1.2). The hub ports determined in the government policies, also written in the National Port Masterplan, is distinct to the perceived hub ports by stakeholders. There is a gap between policy and practice on the port hiearchy.

Table 4.3 Suggestion for the Pattern of Liner Shipping Network Configuration

Shipping Lines's Pattern (Wilmsmeier and Notteboom 2011)			
Phase-1	**Phase-2**	**Phase-3**	**Phase-4**
• Point-to-point direct services with a strong local or regional orientation. • Regional orientation and inter-connectivity to the overseas markets is poor.	• Higher connectivity to overseas markets by consolidating cargo in an intermediate hub. • Increasing dependency to the hub. • Direct regional services start to lose their importance. • Growing connectivity of the port system to overseas markets increases the region's attractiveness to shipping lines & international port operators.	• Port traffic growth leads to a further outreach of the hub-and-spoke network. • The inclusion of new ports. • International port operators further penetrate into the market and state intervention in ports is strongly reduced. • Main lines are growing, smaller regional services start to develop again in a secondary network.	• Market size of specific ports has grown. • Shipping lines started to offer direct services from these ports to overseas regions. • The hub's functional position undermined. • The hub seeks liner service connections to smaller ports which still lack connectivity to overseas market to maintain its role.



Port's Pattern of Concentration-Deconcentration			
Deconcentration	**Concentration**	**Deconcentration**	**Concentration**
Development of load centres, consolidation and intermodal facilities.	• Become dominant hub port cities, • Economies of scale, • Establishing a port hierarchy.	• Increasing need for transshipment, • Rise of secondary ports, • Strategies of transnational operators, • Institutional adaptations.	• Commercial diversification, expansion of foreland, and overlapping hinterland. • Varying levels of productivity & efficiency.

Source: Author, published in Wiradanti et al. (2017), modified from Wilmsmeier and Notteboom (2011, p.226)

Quantitative data on port throughput, cargo and shipping movement are not analysed in this research, respondent's perception on hub ports can still become a proxy to understand the port hierarchy in Indonesia's maritime transport. Interviews showed that these perceived hub ports are different with the 'Main Ports' written in government policies explained in Section 1.5 (Act UU no.17 year 2008 about Shipping, Government Regulation PP no. 61 year 2009 and

Ministerial Decree from the Ministry of Transport No. KP 901 year 2016 on National Port Masterplan). These policies stated that the highest level in the port hierarchy are 38 'Main Ports'. This number is a lot more than the hub ports perceived in the interviews. The policies do not clearly state that these 38 main ports are required to operate a certain level of transhipment. It does not clearly explain transhipment function in each level of the hierarchy. It is seen that these 38 main ports are given the status to represent each province in which they are located. Hence, there is a gap between port hierarchy in policy and real-life practice.

It reveals that geographically having a large archipelago country does not mean that transhipment operations are well designed, managed and operated efficiently to serve its islands. This also shows that having transhipment operations are difficult if cargo volume is very low. Kuala Tanjung and Bitung, chosen by the government to become Indonesia's main international hub, is not working in reality to attract shipping lines to use it as a hub. Still the Eastern Indonesia is much dependent on Surabaya, which is on the eastern tip of East Java (Section 4.1.3).

It is surely a rare case that port hierarchy mapping is conducted in one country such as in Indonesia. Mapping the port hierarchy and continuously updating it should not only be done on paper and by the government themselves. It requires a huge effort to create a standardised infrastructure for ports in the same level of the hierarchy. To be in the same level as Jakarta and Surabaya, hence, ports identified as 'not a secondary hub, not yet a hub' should also have the same standard infrastructure. They should have the same level of containerisation adoption (Hayuth 1981) and same level of Efficiency/Cost (Robinson 1998) as explained in Section 2.1.4.

Besides standardised port facilities and infrastructure which are critical in peripheral ports such as cranes, depth, berthing facilities and road transport links (Section 4.1.2), mapping the port hierarchy also means that ports in the same level has the same sophistication in the shipping network. They should be commercially equal. Makassar, Bitung, Sorong and other potential secondary hubs in Eastern Indonesia which are starting to replace (or follow) Surabaya's position should be supported commercially by collaborating formally with domestic and international shipping lines. Mapping the port hierarchy further means that stakeholders all together should plan and collaborate to manage the direction, where port concentration-deconcentration should be going to. Efforts to map the port hierarchy means that there should be actions to reduce the gap between policy and practice, in terms of the ports listed in each level of the hierarchy. There are no interview quotes to support this since this outcome resulted from comparing literature on port hierarchy, interview coding results, and secondary data (e.g. government documents).

4.2.3 Peripherality as an Aspatial Issue: Political and Human Capacity Issue

This discussion argues that peripherality is also seen as an aspatial issue, related to human aspects. It is understood from the literature that peripherality is also related to aspatial issues, not only related to transport geographic issues (Section 2.1.1 and Section 2.1.2). Moreover, institutional factors in peripheral port challenge is important to increase deconcentration (Section 2.1.5).

Interview results confirms the existence of aspatial issues from literature. Findings show that stakeholders tend to favour direct services than transhipment operations (Section 4.1.2). Growth in peripheral locations are measured using aspatial indirect-measures such as GDP, market growth, consumer growth, and government plans (Section 4.1.2). There is a gap on port hierarchy in government policy and practice in the field (explained in the previous section). Furthermore, this leads to new insights. In Indonesia's case, another dimension of peripherality is seen because political and human capacity issue arise from the port hierarchy itself.

Hub Ports as Political Status

Peripheral locations are faced with 'double peripherality', the need of physical infrastructure development and institutional government initiatives (Monios and Wilmsmeier 2012). Competition between ports to become a selected or preferred hub by shipping lines are explained in abundant literature in Section 2.4.3. However, there is a unique condition in Indonesia where ports are owned and operated by state-owned companies. Hence, port competition as written in the literature is not obviously felt. This leads to port competition in political basis, not by performance or productivity.

Stakeholders perceive that potential ports in Eastern Indonesia are competing with one another to be in the government's focus and development plans. This can be seen in debates or controversies raised in the interviews on which should and should not become Indonesia's main 'hub ports'. These debates include whether the government should or should not develop a hub port in Eastern Indonesia, whether Makassar is considered a hub or not, and whether Bitung or Sorong should be a hub for Eastern Indonesia. Respondents who support central government's decision to give a hub status to Bitung compared to Sorong is because of security reasons. They explained the trade-off between security and sovereignity with having our waters more 'opened' to be used by business and private sectors. They perceive that the nation's security is threatened if international shipping lines could enter freely in Indonesian waters, hence, Bitung is the best location because it is on the up-north edge of Indonesia. Having the central government to control

Indonesian waters and support Bitung (at the northern edge) to become hub could be a valid political distortion since every country has the right to manage its territory. Meanwhile, respondents who argues that Sorong should be the hub is because its centrality position in Eastern Indonesia.

Example of opposing views on Bitung as a hub port are seen from these statements: *"I think Bitung is quite a stable project because, number 1 you have more traffic volume. Number 2 you have existing infrastructure that can be refurbished*" *(FS_2); "Bitung is unlikely to be a hub. Previously a well-known international shipping line came direct to Bitung, only reefer containers, 2 tracks, the route continues from Bitung to Singapore. However, after 1-2 trips they run out of cargo" (SL_7).* Another example of opposing views on Sorong as a hub port are seen from these statements: *"It is strategic on the head of the bird (shape of the Papua island). It could be centre for West Papua, relative larger consumption from other locations in Papua, except Jayapura" (CO_1); "It depends on the distribution, for example from Merauke or Timika, if they have to transit to Sorong before heading to Jakarta, then it would be too far" (LG_2).*

Another way to see that being a hub is perceived politically is by their reactions to the question whether having a hub port in Eastern Indonesia brings benefits. They perceive being a hub port as a higher-level status of a port, a larger size of its infrastructure and the large investments needed. Participants are mostly emotional when they hear the words 'developing a hub port'. The author felt a negative aura during this section of the interviews. They consider this as a waste of resource, not beneficial and pessimistic. They say Indonesia has too many hub ports and unclear classification of which is considered a hub and not. They perceive a hub port not by its transhipment function, however, as the highest status which the government is giving to a port, written in the National Port Masterplan.

As example, when asked about whether upgrading a peripheral port into a hub port is beneficial or not, a financial institution respondent replied *"I do not like this (idea)… What I mean is, I am a bit 'anti' (opposed) with the word hub. Personally, I think it make sense, I understand Indonesia's condition. I can see the Logistics masterplan, and previous government's masterplan. I do not like the words because if we look at it practically, pragmatically. The government is likely to do this. Why is Tanjung Priok far behind Singapore? Why is Singapore such a huge transhipment hub and successful… Singapore maybe 10-12 milion TEUs/year while Tanjung Priok only 5 million TEUs/year? why is Sorong going to be developed into a hub? So, it could handle 20 million TEUs/year? Why do we lose against Hong Kong? Taiwan? I think we*

should not look at it that way, because personally I think ports have a supporting role to economic development" *(FI_5).*

They also perceive that ports should not compete by its 'hub' status. As example, an international port operator replied *"The Chinese build too many hubs. There are too many competitions among Chinese ports. Bad policy. They build too much" (PO_1).* Hence, developing a hub port is perceived as the government having more concern or favour on that particular port and not for the benefit of the surrounding region.

Human Capacity Issues

As explained in Section 4.2.2, port hierarchy mapping is needed for an archipelago country like Indonesia to break out of the peripherality cycle. Mapping the port hierarchy means having an infrastructure upgrade so that ports in the same hierarchy level has standardised facilities and commercially linked in the shipping network. However, this requires collaboration in planning and practice from stakeholders all together. This is where human capacity issue arises.

The terminology 'human capacity' is extracted directly from one of the respondents' answers. A financial institution respondent stated, *"There is no quantitive measure of remoteness, when you do a lending operation all you have to do is to make sure the quality of lending operation other than with geographic. It doesn't do with the strength of particular ministry to carry forward that's one reason we don't do much with XXX, they are extremely difficult to deal with and I won't say they don't have capacity but they lack capacity to carry on with" (FI_2).* The terminology human capacity development is defined by the Food and Agriculture Organization of the United Nations (FAO) as an issue where assistance is needed within individuals, between them and in the institutions they create (FAO 2004).

The human capacity issue identified from the overall interview results shows that not only peripheral locations has less quality human resources (codings on this will be explained in Section 5.1.2). Moreover, it shows human capacity issues within Indonesian people, both public and private sectors, which are unable to implement the port hierarchy, manage transhipment operations to create an efficient hub-spoke network. There is also a misconception where stakeholders are 'waiting for each other' to make a move. The private sector perceives that the government should start first to provide services in peripheral locations and generate more cargo volume by building industries and free trade zones. The private sector also has intention to expand their business in more peripheral locations. Private sectors can not start because they are waiting for government plans. On the contrary, the government is also waiting for the private

sectors to start taking over routes to more peripheral locations and invest in new industries there. This relates back to the 'chicken and egg' concept which triggers our understanding of peripherality as a hub.

Having collaboration from various stakeholders are also difficult. If relevant stakeholders, public and private sectors, could collaborate and have robust planning to implement an efficient port hierarchy in Eastern Indonesia, further on it could build trust with financial institutions and gain financial support for the development. This is definitely a challenge because stakeholders have been working independently and defending each of their interests for such a long time. Furthermore, the nature of cargo volume, shipping connections, port infrastructure in Eastern Indonesia for a long period of time has been path dependent on Indonesia's trade and economic growth naturally without external intervention. More on this in the next section discussion on maritime transport development.

4.2.4 Maritime Transport Development and Path Dependence

This discussion argues that Indonesia's maritime transport is inline with maritime transport development models and path dependence. It is understood from transport geography literature that there are general patterns in which maritime transport is developed. Examples of these models are explained in Section 2.1.4, e.g. the models by Taaffe et al. (1963), Bird (1963, Anyport model, Vance (1970, Mercantile Model) and Rimmer (1977).

Moreover, there are critical moments in port development in the model by Wilmsmeier et al. (2014), also in Section 2.1.4, in Figure 2.5. Growth in volume is first seen, followed by a changing geography and changing structure of cargo, in the same time the port function as a gateway port transforms into a hybrid and transhipment port (Wilmsmeier et al. 2014). Peripheral ports are challenging large hub ports, there is a trend of container traffic deconcentration and a rise of secondary hub ports (Section 2.1.5 and Section 2.1.6). The shift from direct services into transhipment operations is also complementary, not contradictory (Fremont 2007) as explained in Section 2.2.1. Offshore hubs are developed to enable better connection of port and its foreland, as one of the critical aspects in 'port regionalisation' (Notteboom and Rodrigue 2005, 2007; Rodrigue and Notteboom 2010) explained in Section 3.3.1.

General patterns in literature which describe the development of maritime transport can be seen from Indonesia's historical context (Section 1.5) and how it evolves up to today from interview results (Section 4.1.3). Therefore, this study confirms the same general pattern. Figure 4.13 describes the stages in the development of container shipping links in Indonesia's maritime

transport, which spans approximately over 40 years since 1980s. Especially, it confirms the Transport Development Model by Taaffe et al (1963). Their model is described in Table 2.5, Section 2.1.4, which started with having ports scattered along the coasts, then inland transport is established, feeder connections are developed. Further on, interconnection between feeders are developed and finally main roads and main transport corridors are established.

In Indonesia's case, the story goes as follows. Box I in Figure 4.13 depicts the ports scattered along the coasts. They are established from population centres and cities during the empire era and colonialization era in Indonesia's history. Box II shows that Tanjung Priok, Jakarta, started to become a feeder of Singapore in the 1980s since it is the first to adopt containerisation, as explained in Section 1.5.2. Indonesia was very much dependent on Singapore. Box III shows that feeder connections from Jakarta are developed to surrounding ports, including to Surabaya which could also be linked by road. Box IV and Box V shows that Jakarta – Surabaya route becomes critical as Surabaya emerges as hub to serve Indonesia's eastern region, approximately in the mid 2000s (Section 1.5.3).

Today, Indonesia's largest hubs which connects the country to international trade are Jakarta and Surabaya. Main Hub to eastern Indonesia is still Surabaya, however, it is seen that Makassar is starting to follow Surabaya's position (interview results explained in Section 4.1.3). This is reflected in the last box, Box VI, which pictures predictions where will the next hub be in Eastern Indonesia. Overall, the hub development moves from Singapore, then to Jakarta, Surabaya, then it is now showing a tendency to move to Makassar, Bitung, Ambon, Sorong or Jayapura, which are identified as 'not peripheral, not yet a hub'. The idea to establish a hub in the Eastern region is confirmed beneficial here. However, comparing whether Makassar, Bitung or Sorong as the appropriate transhipment hub for Eastern Indonesia requires further analysis of shipping line services in more detail, which lies beyond the scope of this Thesis.

Overall, Figure 4.13 shows how the interview results and Indonesia's history fit with maritime transport development pattern in the literature. There is quite a long period of time for port concentration-deconcentration to occur and shift to the next peripheral ports, as example the deconcentration to Jakarta from Singapore, concentration in Jakarta then deconcentration to Surabaya. Findings shows that both concentration and deconcentration are occurring, since there are ports that are 'not a peripheral but not yet a secondary hub'. It is dynamic, with these two processes of concentration and deconcentration are reccurring. It eventually drives changes in shipping line's decision between providing transhipment and direct services.

Increasing transshipment activities are aimed to expand shipping connections to more places. The rise of secondary hub ports indicates that deconcentration are as a result of concentration itself, but in an expanding network. Developing a hub port in Eastern Indonesia is an effort to leap and speed up natural trade and economic growth. It is still unclear whether it is really going to work. Nevertheless, path dependence is significant from Indonesia's maritime transport history and should be considered when planning the next stages of transport development.

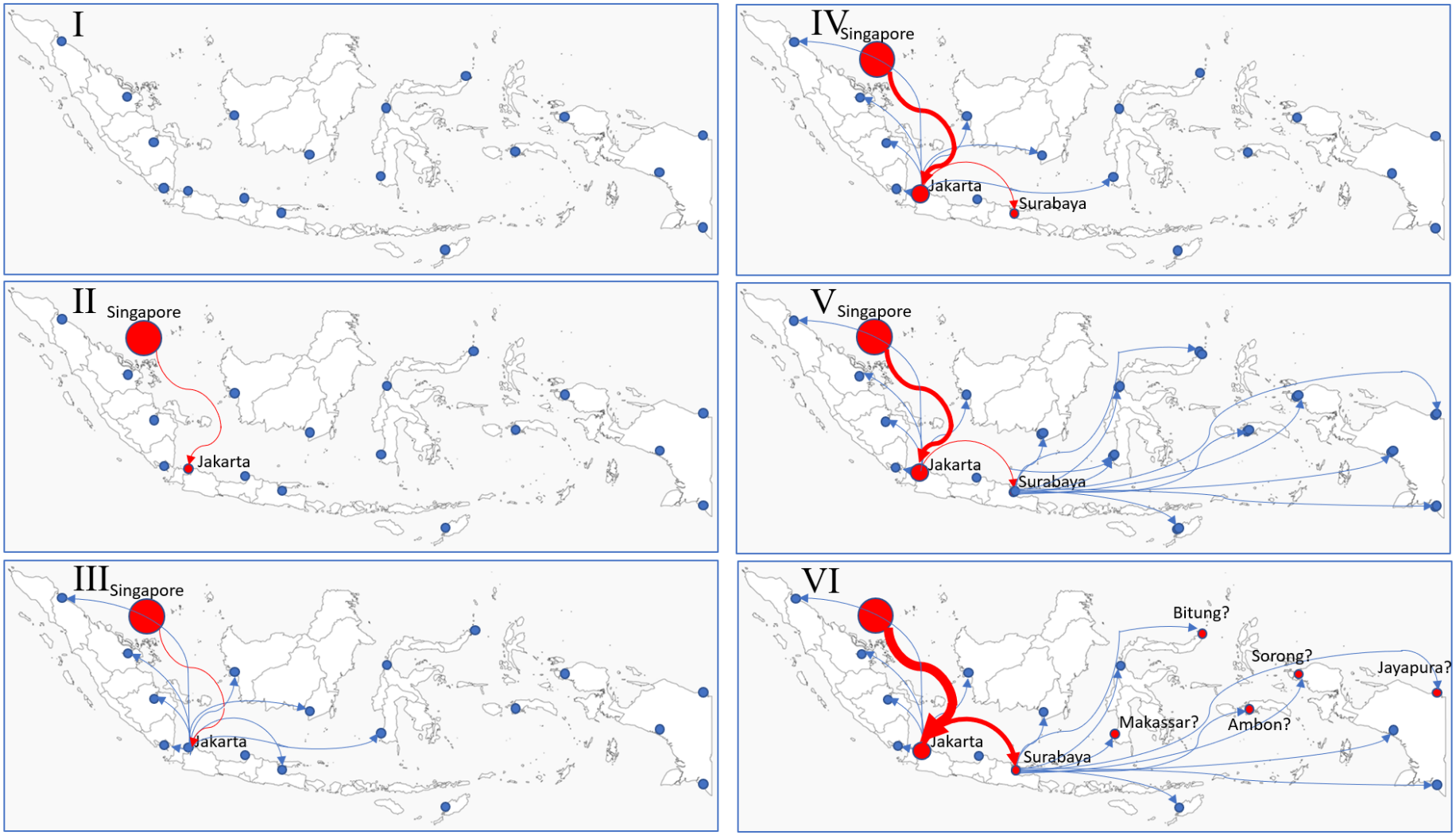
Either it is to Makassar, Bitung, Ambon, Sorong or Jayapura. Moreover, Indonesia's maritime transport development represented by Figure 5.15 also reveals that deconcentration of port traffic moves to emerging secondary hubs which are locations with emerging economic growth. This is because Sulawesi Island and Maluku-Papua Islands at the moment has the first and third highest percentage of GDP growth compared to other islands (Section 3.3.3).

4.3 Conclusion

A purely qualitative approach is adopted to understand in-depth what peripherality is in Indonesia's maritime transport sector (research question-1). In this chapter, findings from main interviews were revealed from its codes, themes and meaning. The analysis also aligned with literature in Chapter 2 and Chapter 3, and which are unique contributions of the Thesis. Overall, the finding and discussions confirm the literature without any major confrontations or clashes. However, it complements the literature on four important points as follows.

First, is that peripherality is a cycle. This cycle starts with having low cargo volume, low shipping connections, insufficient port infrastructure, low economic activities, low population and political power, and back to having low cargo volume. Strategies to break out of the cycle are by generating cargo volume, exploring new market, developing hubs and increasing economic activities. Second, is that specifically in archipelago countries, additional considerations are to map the port hierarchy and identify division of tasks to be able to manage port concentration and deconcentration.

Third, is that peripherality is an aspatial issue as well. This relates to political and human capacity issues. When being a hub port is perceived as a political status, it hinders the strategies to break out of peripherality cycle. Lastly, maritime transport development in an archipelago like Indonesia is aligned with classical transport development models and path dependency concept. This happens in a long period of time following the speed of trade and economic growth. Hence, to speed up the process, all related stakeholders should understand their role and collaborate to break out of the peripherality cycle.



Source: Author. Blue dots: feeder ports; Red dots: hub/secondary hub ports; Blue lines: emerging routes; Red lines: main routes.

Figure 4.13 Stages in the Development of Container Shipping Links in Indonesia's Maritime Transport

Chapter 5
Factors for a Peripheral Port to Become a Hub

"The mission would, therefore, lie in the traditional Japanese concept of 'harmony' between ports. In this context, Japanese ports are not losing out in port competition with the ports in proximity. Japan's economy would without doubt benefit from the growth of mega hub ports in East Asia such as Busan and Shanghai" (Shinohara 2009, p.246).

This chapter explains findings, discusses and answer the second and third research questions on factors needed for peripheral port to become a hub. It combines input from literature review (Chapter 2), research methodology, and qualitative-quantitative research process (Chapter 3).

5.1 Findings from Main Interviews

As explained in Chapter 4 on Methodology, variables selected from literature are combined with findings from main interviews, which contributes to identifying latent variables and item variables (Section 4.4.2). In a 'sequential' mixed-methods, qualitative data are transformed into quantitative instrument design with details as follows: interview quotes are transformed into item variables, codes are transformed into group of items; themes are transformed into scales (Cresswell 2014, p.226). Latent and item variables are then used as survey questionnaire is developed, with a purpose to distinguish which item variables are critical to create deconcentration to ports in more peripheral locations: **"to become a hub, a peripheral port needs to have….?"**. There are 7 latent variables identified, representing 111 item variables, which all together explains why concentration-deconcentration happens.

5.1.1 Latent Variables

The 7 independent latent variables identified are shown in Figure 5.1 which a peripheral port needs to have to become a hu or secondary hub port. First are Port Convenience, related to the peripheral port's convenience which could be controlled or improved in a long-term period of time. Second are Port Tangible Aspects, related to the peripheral port's hard/physical infrastructure or facilities. Third are Port Intangible Aspects, related to the peripheral port's soft operational and main service performance/efficiency, which could be controlled or improved in a shorter period of time. Fourth, are Port Cluster and Environment. This is related to activities in

the peripheral port's cluster and environment, surrounding the port which is not the main service of the port. Fifth are Cargo, which is related to the peripheral port's cargo, throughput and types of cargo. Sixth are Private Sector Involvement, related to private sector involvement in the peripheral port's ownership, operations and investments. Seventh are Government Investment and Policy, which is related to private sector involvement in the peripheral port's ownership, operations, investments, planning and policy. Overall it shows a hypothesis that in order to become a hub, a peripheral port needs to have port convenience; port tangible aspects; port intangible aspects; port cluster and environment; cargo; private sector involvement; and government investment and policy.

Source: Author

Figure 5.1 Quantitative Model based on Literature Variable Selection and Results of Main Interviews

5.1.2 Item Variables

Item Variables in X1 - Port Convenience

Item variables identified from literature related to port convenience includes: Inland distance; Less competition for port and shipping; Available sea routes; Low congestion; Various cargo handling services; Customs integration; Natural depth; Safety and security; Sea distance to main routes; Sea distance to feeder ports; Sea distance to hub ports; Reputation (Sources compiled in Table 3.17 in Section 3.3.1). 6 out of 12 item variables identified from the literature are

recognised and coded as interview findings, shown in Table 5.1. Furthermore, there are two emerging items identified in interviews, which are: less competition with other modes of transport and less competition for shipping. These emerging item variables are described in Italic.

Table 5.1 Comparing Latent Variable X1 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X1	**Port Convenience**							
X1.1	Shortest inland distance from the sea	-	-	-	-	-	-	-
X1.2	Less competition for port	6	7	0	2	1	0	1
X1.3	Available sea routes	-	-	-	-	-	-	-
X1.4	Low congestion	0	0	0	0	1	0	0
X1.5	Various cargo handling services, multipurpose	-	-	-	-	-	-	-
X1.6	Customs integration	-	-	-	-	-	-	-
X1.7	Natural depth	4	6	1	0	3	0	1
X1.8	Safety and security	-	-	-	-	-	-	-
X1.9	Short sea distance to main routes	0	0	0	0	3	0	0
X1.10	Short sea distance to feeder ports	7	9	4	0	4	3	2
X1.11	Further away sea distance to other hub ports	2	0	0	1	1	0	0
X1.12	Port's reputation	-	-	-	-	-	-	-
*X1.13**	*Less competition with other modes of transport*	*1*	*0*	*1*	*1*	*2*	*2*	*0*
	Example quote: "the budget for road development throughout Indonesia, national road, is equivalent to the budget for sea transport in the Ministry of Transport" (CG 7).							
*X1.14**	*Less competition for shipping*	*1*	*8*	*0*	*1*	*0*	*0*	*0*
	Example quote: "Nusa Tenggara and Maluku, we are not expanding there, because they already have an established shipping line there brand X and brand Y. We do not really intend to open new branches where other colleague domestic shipping lines is in charge there, we do not want to snatch their cake, we want to find opportunities for each of us" (SL 2).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Item Variables in X2 - Port Tangible Aspects

Peripheral ports need to have port tangible aspects to become a hub or secondary hub port. Item variables identified from literature related to port tangible aspects includes: Depth; Quay/berth length; Cranes Container yard; Facility availability; Facility reliability; Storage space/warehouse; Overall port capacity; Standardised technical infrastructure (Sources compiled in Table 3.17 in Section 3.3.1). 6 out of 9 item variables identified from the literature are recognised and coded as interview findings, shown in Table 5.2. Furthermore, there is one emerging item identified in interviews, which is continuous infrastructure upgrade. There are also other facilities mentioned in the interviews, which are too detailed and not included in the item variables such as cold storage, electricity, storage tank, deep freezer.

Table 5.2 Comparing Latent Variable X2 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X2	**Port Tangible Aspects**							
X2.1	Depth of port channel and basin	7	7	4	1	2	0	0
X2.2	Quay or berth length	2	4	6	1	2	2	1
X2.3	Cranes for loading-unloading	3	8	8	0	2	2	0
X2.4	Container stacking yard	1	4	0	0	0	0	1
X2.5	Availability of other handling equipment	-	-	-	-	-	-	-
X2.6	Reliability of other handling equipment	0	0	0	0	0	0	1
X2.7	Storage space, warehouse, liquid bulk tank	2	3	5	0	0	0	0
X2.8	Overall port capacity	-	-	-	-	-	-	-
X2.9	Standardised port infrastructure	-	-	-	-	-	-	-
*X2.10**	*Continuous infrastructure upgrade*	*3*	*8*	*1*	*0*	*4*	*1*	*1*
	Example quote: "To open locations that are isolated, we open them by building infrastructure and facilities such as ports, terminal, then manage to get perintis ships (pioneers) to enter their routes in. Both sides needs to be done, first from port facilities, second from the sea freight" (LG_4).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Item Variables in X3 - Port Intangible Aspects

Peripheral ports need to have port intangible aspects to become a hub or secondary hub port. Item variables identified from literature related to port intangible aspects includes: Overall port efficiency; Cargo handling efficiency; Low cargo damage; Reputation; Interesting promotions; Logistics services (warehousing, ff, LCL handling etc); Transhipment and other value added services; IT ability (information and communications); Stability of port's labour; Port management; Good management and labour relations; 24/7 service; Communicative and responsive; Cargo tracking system (Sources compiled in Table 3.18 in Section 3.3.1). 4 out of 13 item variables identified from the literature are recognised and coded as interview findings, shown in Table 5.3.

Furthermore, there are four emerging items identified in interviews, which are: overall quality human resource; profitable; containerisation initiation; and other value-added services. The item variable related to container initiation is actually mentiond in literature (Hayuth 1981; Notteboom 1997). Their precise words are 'to be the first in implementing containerisation and new technology'. It was deleted during variable selection since it is considered to have too much detail and difficult to measure how far container initiation should be supported. However, the interview results support this. Peripheral ports and domestic shipping need to initiate containerisation in some locations in order to become secondary hubs, hence, it is recalled.

Table 5.3 Comparing Latent Variable X3 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X3	**Port Intangible Aspects**							
X3.1	Overall port efficiency	3	5	2	0	1	0	2
X3.2	Cargo handling efficiency	-	-	-	-	-	-	-
X3.3	Low cargo damage	-	-	-	-	-	-	-
X3.4	Incentives and promotions	-	-	-	-	-	-	-
X3.5	Logistics services (warehousing, freight forwarding, LCL handling)	-	-	-	-	-	-	-
X3.6	Transhipment service (consolidate cargo from different origins to be sent to different destinations)	-	-	-	-	-	-	-
X3.7	IT ability (information and communication)	1	2	2	0	1	0	0
X3.8	Stability of port's labour	-	-	-	-	-	-	-
X3.9	Standard quality of port management	0	0	0	0	2	0	0
X3.10	Good management and labour relations	0	1	0	1	1	0	0
X3.11	24/7 service	-	-	-	-	-	-	-
X3.12	Communicative and responsive	-	-	-	-	-	-	-
X3.13	Cargo tracking system	-	-	-	-	-	-	-
*X3.14**	*Overall quality of human resource*	*3*	*8*	*2*	*4*	*0*	*2*	*0*
	Example quote: "Don't let private sector are ready to bring their ships there but the cargoes are unable to be discharged because the port facility is not available. Hence, for me what is critical are first the facilities, second the human resource. There are ports nowadays constrained by facilities and human resource" (LC_4).							
*X3.15**	*Financially profitable*	*1*	*0*	*0*	*0*	*0*	*0*	*0*
	Example quote: "There are example ports changing from 4th class ports to 4rd class ports, like Manado… decisions to change its class is from their traffic and profitability" (PO_5).							
*X3.16**	*Developing/initiating containerisation facilities*	*9*	*8*	*0*	*0*	*2*	*0*	*0*
	Example quote: "Yes, we are ready to become pioneer, if we are the first to enter, we are ready to bear the initial conditions which is not yet profitable" (PO_3).							
*X3.17**	*Other value-added services (water, rubbish, bunkering, etc.)*	*2*	*1*	*0*	*0*	*0*	*0*	*0*
	Example quote: "Today if something doesn't work, they puff it back to Surabaya and most productive and interesting ways. But once your ship is there, you can refuel it, you can do repairs on it because the base is Surabaya. But do place like Bitung and Surabaya have those place available? That's not the only thing. Marine fuel, spare parts and components, that is also marine waste. Ship waste. You have your sludge, you have your sanitation, ballast water and regular waste. It all needs to come up because you move the center into somewhere else" (FI_2).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Item Variables in X4 - Port Cluster and Environment

Peripheral ports need to have port cluster and environment to become a hub or secondary hub port. Item variables identified from literature related to port cluster and environment includes: General road connecting the surrounding cities; Highways connecting the port; Railways connecting the port; Waterway/river connecting the port; Intermodal transport links; Available land for port and logistics expansion; Relatively cheap land; Certain population metropolitan area; Certain surface metropolitan area; International forwarding agents; Relatively cheap labour cost; Load centres; General access to load centres; Special economic zone; Sufficient hinterland; Market power / economic activity of hinterland; Overlapping hinterland; Expansion of foreland (Sources compiled in Table 3.19 in Section 3.3.1). 9 out of 18 item variables identified from the literature are recognised and coded as interview findings, shown in Table 5.4.

Furthermore, there are five emerging items identified in interviews, which are: existing basic infrastructure; new local market; local ferile land; near tourism sites; and new industrial sites. The item variable related to local fertile land is actually mentiond in McCalla (2008). Their precise words are 'physical land characteristics (quantity, topography, geology)'. It was deleted during variable selection since it is considered to have too much detail and difficult to measure. However, the interview results support this from cargo owners who has business related to plantations, hence, it is recalled.

Item Variables in X5 – Cargo

Peripheral ports need to have cargo to become a hub or secondary hub port. Item variables identified from literature related to cargo includes: Overall cargo volume; Transhipment cargo volume; Container cargo volume; Local cargo volume; Increasing need for container transhipment; Niche market/specialised cargo volume; Economies of scale from increased cargo throughput; High value cargo; Low value cargo (Sources compiled in Table 3.20 in Section 3.3.1). 2 out of 9 item variables identified from the literature are recognised and coded as interview findings, shown in Table 5.5.

Furthermore, there are four emerging items identified in interviews, which are: mapping of cargo; natural resource cargo; availability of raw material cargo for industry/manufacturing; and export cargo on continuous basis. The item variable related to availability of raw material is actually mentiond in Yurimoto and Masui (1995) and McCalla (2008).

Table 5.4 Comparing Latent Variable X4 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X4	**Port Cluster and Environment**							
X4.1	General road connecting the surrounding cities	1	0	2	3	1	0	1
X4.2	Highways connecting the port	3	1	7	1	1	3	0
X4.3	Railways connecting the port	-	-	-	-	-	-	-
X4.4	Waterway/river connecting the port	0	0	1	0	0	0	0
X4.5	Intermodal transport links	-	-	-	-	-	-	-
X4.6	Available land for port and logistics expansion	0	3	0	2	2	0	1
X4.7	Relatively cheap land	0	0	0	2	0	0	0
X4.8	Certain population metropolitan area	2	1	1	0	5	0	0
X4.9	Certain surface metropolitan area	-	-	-	-	-	-	-
X4.10	International forwarding agents	-	-	-	-	-	-	-
X4.11	Relatively cheap labour cost	-	-	-	-	-	-	-
X4.12	Load centres	0	1	0	0	3	0	0
X4.13	General access to load centres	-	-	-	-	-	-	-
X4.14	Special economic zone	2	0	3	1	5	4	0
X4.15	Sufficient hinterland	0	0	0	0	2	0	0
X4.16	Market power / economic activity of hinterland	-	-	-	-	-	-	-
X4.17	Overlapping hinterland	-	-	-	-	-	-	-
X4.18	Expansion of foreland	-	-	-	-	-	-	-
*X4.19**	*Existing basic infrastructure (electricity, water, road, etc.)*	*4*	*10*	*1*	*2*	*5*	*0*	*2*
	Example quote: "Infrastructure, it needs to be there as back up. Internet, electricity, road, because not just ordinary road, it needs to accommodate container trucks to turn, not only small cars, also labour. Just like an urban logistics" (LC_2).							
*X4.20**	*New local market*	*1*	*8*	*2*	*0*	*3*	*0*	*1*
	Example quote: "We acknowledge that developing a new business needs time, if we build a location from zero, if we enter to distribute goods smoothly, raw material and building materials until the location grows, eventually when we become pioneers, we will also feel the cargo rising. That is what our owner has been doing to pioneer in the eastern region for the last few years" (SL_2).							
*X4.21**	*Local fertile land*	*0*	*0*	*0*	*2*	*0*	*0*	*0*
	Example quote: "First we look at the soil, whether it is suitable or not, second is whether the land is expensive or not. For a plantation, we need a large are. Third is human resource, whether it is available or not. Then see the provincial minimum wage" (CO_5).							
*X4.22**	*Near tourism sites*	*0*	*2*	*1*	*1*	*4*	*1*	*1*
	Example quote: "Bitung is closer to thee Philippines than Sorong. For our navy it is also easier to control from Bitung than Papua. Geographically, Japan is our main trading partner, not Australia. Bitung also has a depth of 40metres. Lembata island near Bitung can be built into a tourism destination like Singapore" (LC_3).							
*X4.23**	*New industrial sites*	*4*	*1*	*3*	*1*	*13*	*2*	*0*
	Example quote: "For the Indonesian domestic shipping pendulum (tol laut) to work then industrial centres should be built in the eastern region. If we focus to Sorong, then other regions in Papua until Merauke must be built industrial centres, micro/small-medium enterprises, to become feeder" (CG_3).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Table 5.5 Comparing Latent Variable X5 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X5	**Cargo**							
X5.1	Overall cargo volume	3	1	2	1	9	0	0
X5.2	Transhipment cargo volume (consolidated cargo from different origins to be sent to different destinations)	Coded as peripheral location having low cargo volume (explained in Section 5.1.1)						
X5.3	Container cargo volume							
X5.4	Local cargo volume	1	1	1	1	1	0	4
X5.5	Increasing need for container transhipment	-	-	-	-	-	-	-
X5.6	Niche market, specialised cargo volume	-	-	-	-	-	-	-
X5.7	Economies of scale from increased cargo throughput	-	-	-	-	-	-	-
X5.8	High value cargo	-	-	-	-	-	-	-
X5.9	Low value cargo	-	-	-	-	-	-	-
*X5.10**	*Mapping of cargo*	*2*	*0*	*0*	*0*	*3*	*1*	*0*
	Example quote: "You have to sort of have certain differentiation, depending on the region. What is the natural strength of this area, in terms in product or manufacturing services, should be the core economic activities of this sorong and papua area. How to grow that economy, regional" (PO_1).							
*X5.11**	*Availability of natural resource cargo*	*Coded as potential cargoes in Indonesia's peripheral locations (explained in Section 5.1.1)*						
	Example quote: "It could facilitate return cargos of this area, fish tropical fruit, coconut, out of primary sector like fishery and agriculture" (FI_2).							
*X5.12**	*Availability of raw material cargo for industry/manufacturing*	*1*	*2*	*0*	*4*	*0*	*0*	*1*
	Example quote: "Investors hope that they can use raw material from the local area, because the cost will be high if it is from other locations. Industries tend to be close to where its raw materials are" (PO_2).							
*X5.13**	*Export cargo on continuous basis*	*0*	*2*	*0*	*1*	*1*	*0*	*1*
	Example quote: "Its generating the volume, finding a sustainable way of get large volumes of that into one place, and from there on to wherever you need to get it out. There it has to do with the export markets. It has to do with finding the right export products. We are doing a little bit of work there because it doesn't start with over the night build a banana industry in Ambon. But we can see that there are a lot of coconut and coconut-based products in Bitung. How can we diversify it and containerize it. That's one. Identifying those products and identifying those markets" (FI_2).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Their precise words are ‘quality of raw material’. It was deleted during variable selection since it is considered to have too much detail and difficult to measure. However, the interview results support this. Specifically, mentioned by respondents in shipping and logistics companies who transports the cargo, hence, it is recalled. Another item variable recalled is related to export cargo. It is actually mentioned in Blonigen and Wilson (2006) with precise words as ‘trade volume in International trade’. It was deleted during variable selection since it is considered to be a definition and characteristics of peripherality. However, the interview results support this. Specifically, mentioned by respondents in shipping and central government, hence, it is recalled.

Item Variables in X6 – Private Sector Involvement

Peripheral ports need to have private sector involvement to become a hub or secondary hub port. Item variables identified from literature related to private sector involvement includes: Foreign sector involvement; Sound investment system; Financial assistance for investing companies; Terminal ownership/ contracts policy; Concentration of investment; Strategy of transnational operators; Strong relations port/port authority with shipping; Port devolution; Shipping involvement in terminal; Shipping alliance formation (Sources compiled in Table 3.20 in Section 3.3.1). 1 out of 10 item variables identified from the literature are recognised and coded as interview findings, shown in Table 5.6. Furthermore, there are nine emerging items identified in interviews, which are: not over invest; entrepreneurship; collaboration with local industries; collaboration with shipping lines; clear phases of investment; involve in CSR programmes; incentives for first players; less monopoly; private sector involvement in National Planning.

Item Variables in X7 – Government Investment and Policy

Peripheral ports need to have government investment and policy to become a hub or secondary hub port. Item variables identified from literature related to government investment and policy includes: Government policy to prioritise peripheral ports; National government plan; Active interface Port Authority (regulator) and port (operator); Political stability; Customs regulation; Export and international trade policy; Tax cut/ exemption; Local gov administration (Sources compiled in Table 3.21 in Section 3.3.1). 2 out of 8 item variables identified from the literature are recognised and coded as interview findings, shown in Table 5.7. Furthermore, there are seven emerging items identified in interviews, which are: Active interface between port authority (regulator) and port operator; Local and provincial government initiative; Aligned with cabotage law / protectionism; Specific policy (e.g. fishing moratorium); Less bureaucracy; Central government initiatives (e.g. subsidy); and Central government coordination with local/provincial government and private sector.

Table 5.6 Comparing Latent Variable X6 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X6	**Private Sector Involvement**							
X6.1	Private sector involvement in operations (concession, leasehold, Build Operate Transfer, etc.)	1	2	0	0	6	0	2
X6.2	Sound investment system	-	-	-	-	-	-	-
X6.3	Financial assistance for investing companies	-	-	-	-	-	-	-
X6.4	Exclusive contracts policy for dedicated terminal	-	-	-	-	-	-	-
X6.5	Concentration of investment	-	-	-	-	-	-	-
X6.6	Strategy of international port operators	-	-	-	-	-	-	-
X6.7	Strong relations between port/port authority and shipping	-	-	-	-	-	-	-
X6.8	Private sector involvement in port ownership/port devolution	-	-	-	-	-	-	-
X6.9	Shipping involvement in terminal	-	-	-	-	-	-	-
X6.10	Shipping alliance formation	-	-	-	-	-	-	-
*X6.11**	*Not over invest*	*1*	*1*	*0*	*0*	*1*	*0*	*2*
	Example quote: "I think the connection of networking selectively one area in surrounding bigger port to deliver at go goods i think its crucial in indonesia. But at the same time, we dont want to build infrastructure at after one year or two year of lagging the using the ports over investments. We have to upscale. Remember, the international airports in Srilanka is empy, empty after how many billions investment buy China" (FI_4).							
*X6.12**	*Local enterpreneurship*	*0*	*1*	*0*	*0*	*3*	*0*	*0*
	Example quote: "How do you create new economic growth? Give the resources to local community, develop entrepreneurs, then make new organisations and companies. Give access to capital and skilled labour. Lastly is the infrastructure. Peripheral locations should be based on new business or activities firts, not the other way around" (CG_1).							
*X6.13**	*Collaboration with local industries*	*5*	*6*	*0*	*0*	*2*	*0*	*1*
	Example quote: "From Jakarta to Palembang, we send them staple food, flour, cement, anything, because we supply for the development there. However, there is no cargo in returen. Eventually, we establish collaborations. And they are also willing to collaborate. Because they need to export their goods and we need their cargo" (SL_8).							
*X6.14**	*Collaboration with shipping lines*	*2*	*6*	*4*	*0*	*7*	*0*	*0*
	Example quote: To become an international hub, inevitably we need to 'hook up' with shipping lines… maybe with special discounts, maybe there will be direct, but it is difficult. Operators themselves do not want to get losses" (CG_4).							
Annotation: The numbers explains how many times it is referenced in the interview. '-' means that there is none of the code explains the item variable *)Variable added from interview results								

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Comparing Latent Variable X6 from Literature with Interviews Results (continued)

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
*X6.15**	*Clear phases of investment (time and amount of investments)*	2	1	1	1	0	0	1
	Example quote: "Surely with analysis, if the prospect is there. For example, we have business of a 100, but for now with 40 we will work on it because we build the size phase by phase. Most importantly is that we target to reach 100" (CO_3).							
*X6.16**	*Involve in CSR programmes*	3	10	0	0	0	2	0
	Example quote:"We have a couple of Corporate Social Responsibility initiatives, which we call enabling trade initiative. This focuses on small ports, outports, where there are potential, however, since they do not have the know-how about logistics then it leads to expensive logistics cost, no access is opened. Their access to the world and the world to them. Hence, commodities that could be competititve like coconut, tuna, can not be exported and access to import goods are also becoming expensive for them" (SL_5).							
*X6.17**	*Incentives for first local partners*	0	6	0	1	0	2	0
	Example quote:"For us entering the eastern region as pioneer is a bloody struggle. Because the local government and local Pelindo are not ready in terms of infrastructure. They only provide berthing area so ships can berth. It means we need to analyse the capacity and strength of the berth, whether it is reliable or not for ships to berth with a certain Gross Ton. If the analysis is feasible, then we will consider more things such as facilities to discharge there, what should we use, what should we invest there, we bring the cranes. Sub cranes only has limited capacity, only a couple of tons. Hence, if we need more capacity, more than 10-20 tons, we should use shore cranes" (SL_2).							
*X6.18**	*Less monopoly*	0	4	1	0	0	0	0
	Example quote:"In the end of course if you want to compete with monopoly. Monopoly can charge high cost. So when youre breaking the monopoly you can get the price down. I think its fair to say that the price for transhipment is very very low" (SL_1).							
*X6.19**	*Private sector involvement in National Planning*	0	1	0	1	2	1	0
	Example quote: "Actually we have involved all Ministries, its okay for the country to have an international hub port. Until now it hasn't materialised because the market is not fulfilled eventhough we have enough capacity. We just need to put more effort to attract shipping lines" (CG_4).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Table 5.7 Comparing Latent Variable X7 from Literature with Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X7	**Government Investment & Policy**							
X7.1	Government policy to prioritise peripheral ports	-	-	-	-	-	-	-
X7.2	Supported by national planning for port and logistics	1	1	0	1	3	1	3
X7.3	Supported by local and provincial government planning	-	-	-	-	-	-	-
X7.4	Political stability	1	0	0	0	1	0	0
X7.5	Supported by customs regulation	-	-	-	-	-	-	-
X7.6	Supported by export import and international trade policy	-	-	-	-	-	-	-
X7.7	Tax cut/ exemption	-	-	-	-	-	-	-
X7.8	Efficient local and provincial gov administration	-	-	-	-	-	-	-
*X7.9**	*Active interface between port authority (regulator) and port operator*	1	0	0	0	2	0	0
	Example quote: "For us, we leave it to the operatoors, we have given them concession. So its B2B. Its their obligation to engage. We only look at the Port Masterplan, what is the capacity promised, between us is a contract agreement. To attract shipping lines, it should be the operator's duty, written in the appendix of the concession agreement" (CG_4).							
*X7.10**	*Local and provincial government initiative*	0	0	0	0	3	0	0
	Example quote: "Improved management is needed. From the port's point of view, they should collaborate with local government, how to increase economic growth in the area. Talking about cargo consolidation needs to collaborate between regency leaders, or provincial governors so that cargoes could be consolidated in one location. It depends also on the type of cargo to be sent"(CG_7).							
*X7.11**	*Aligned with cabotage law / protectionsim*	2	10	0	5	8	0	0
	Example quote: "It is because of the challenge. From the south we are chanllenged by Australia, from the north are Asia pacific nations. International transport lanes goes through here. So Sorong fits more than Merauke or other locations. This is the archielagic sea lanes. So Indonesia is closed now. Long ago it was just islands, after the Juanda declaration in UNCLOS, we are acknowledged as an archipelago, so our area is closed. Since our territory is in the world's crossroad, various ships pass by, we have the obligation to provide sea lanes… We have posts at the edge of those islands. We are also securing illegal fishing as mandated by the Ministry of Fisheries and Customs" (CG_3).							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Comparing Latent Variable X7 from Literature with Interviews Results (Continued)

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
*X7.12**	*Specific policy (e.g. fishing moratorium)*	2	1	0	1	5	4	0
	Example quote: "In Ambon and Bitung now Indonesia have a very strong Minister of fisheries where she caught a lot of of illegal fisheries, because of that policy Indonesia have abundant amount of fish but they have to manage that fish in a very premium quality that can bring you a lot of money. Currently they don't have any cold supply chain in that area so they cannot produce any premium product that can be exported. They have high requirement standard that our product cannot fit in. We cannot maintain the cold supply chain, that's from cathing, putting it to river container, put it in cold storage in the port, processed it a bit and export it in a fresh for instance, because the highest of the premium prices of the fish . We encourage government to make fish supply chain in that area" (LC_1).							
*X7.13**	*Less bureaucracy*	5	0	6	2	3	5	3
	Example quote: "Sri Langka is very good because that will be transhipment to Africa and middle east, they have also have proximity to Indian mainland which is a huge amount. Why you don't invest in Indian ports, too much bureaucracy, labour not good. That kind of stuff" (PO_1).							
*X7.14**	*Central government initiatives (e.g. subsidy)*	5	4	2	1	13	5	2
	Example quote: "Our financial support is not forcing. Us and other multilateral development banks can not force loans to a country. It has to come from the country itself. Whether they say they need our help 'to build a port here', it has to come from them, then we will see. The definitely will ask our support for a smaller port, not a large investment for private sectors. For the government, if private sector can enter the business then why take loans"(FI_5).							
*X7.15**	*Central government coordination with local/provincial government and private sector*	0	1	0	0	1	1	0
	Example quote: "Perception of where the hub is located should be synchronised, between all policie documents… on Kuala Tanjung, Bitung… the government now wants to have direct call. How far is it beneficial to have direct call, or having Kuala Tanjung and Bitung as a hub port? There is also a plan to make Seget as a third hub port. Makassar is also developed to have direct call by Pelindo 4… also in East Kalimantan… Teluk Lamong in East Java by Pelindo 3 has already direct calls" (CG_6)							
Annotation: The numbers explains how many times it is referenced in the interview. '-' means that there is none of the code explains the item variable *)Variable added from interview results								

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Overall, item variables from literature are partially confirmed by interview results (see the dashes on each Table). Items that are not confirmed by interview codings might be caused by the background of the respondents themselves. Their background experience may not encounter those items as an issue in Indonesia's context. Otherwise, because of the time limitation during the interviews, those items are less important than the items they mentioned. Nevertheless, the total of 111 item variables identified shows that concentration-deconcentration factors has been comprehensively explored. Findings on concentration-deconcentration factors from interviews are summarised in the following Findings Box 5A.

Findings 5A:
There are 7 categories of variables and 111 item variables, identified from literature and interview results, which are considered needed by a peripheral port to become a hub or secondary hub port.

5.2 Findings from Survey

Findings from survey consists of descriptive statistics for each item variables, descriptive statistics by stakeholder types and EFA results. Before findings from EFA is examined, it is first looked at the feel of the overall survey data. The 'feel' for the data is examined from its central tendency and dispersion, which includes the mean, range, standard deviation and variance (Sekaran 2003, p.306). A good response to each individual item variables shows that the data has a good spread (range) and shows very little variability, which means the particular question is properly worded and respondents understand the intent of the question (Sekaran 2003).

5.2.1 Descriptive Statistics

X1 - Port Convenience

Responses are calculated its mean value for each item variables to understand the average and standard deviation. The following Table 5.8 describes the mean value and standard deviation for each item in variable X1 (Port Convenience). Items with the highest mean or importance are Safety and security (X1.8), Customs integration (X1.6) and Available sea routes (X1.3). The lowest importance is item Less competition for shipping (X1.14).

In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.2. Items most prioritised are Safety and security (X1.8), Available sea routes (X1.3) and Customs integration (X1.6). Respondents chose the same three items which they perceive as the top three priorities. Hence, their response match and consistent.

X2 - Port Tangible Aspects

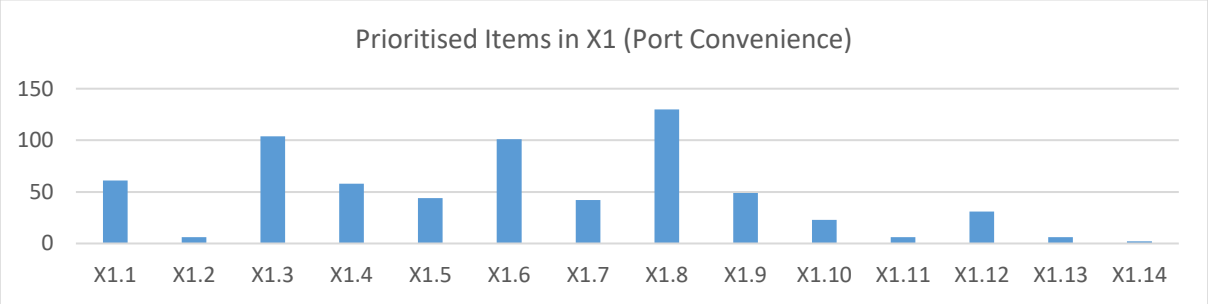
The following Table 5.9 describes the mean value and standard deviation for each item in variable X2 (Port Tangible Aspects). Items with the highest mean or importance are Cranes for loading-unloading (X2.3), Continuous infrastructure upgrade (X2.10) and Overall port capacity (X2.8). The lowest importance is item Storage space, warehouse, liquid bulk tank (X2.7).

In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.3. Items most prioritised are Cranes for loading-unloading (X2.3), Depth of port channel and basin (X2.1) and Overall port capacity (X2.8). Respondents chose the same two items which they perceive as the top three priorities, they are X2.3 and X2.8. Another prioritised item is the Depth of port channel and basin (X2.1). Hence, their response is partially consistent.

Table 5.8 Mean Value for Port Convenience Items

	Item Variable	Mean	S.D
X1.1	Shortest inland distance from the sea	5.68	1.46
X1.2	Less competition for port	4.56	1.56
X1.3	Available sea routes*	**6.44**	0.83
X1.4	Low congestion	6.02	1.24
X1.5	Various cargo handling services, multipurpose	5.75	1.29
X1.6	Customs integration*	**6.44**	0.95
X1.7	Natural depth	5.84	1.33
X1.8	Safety and security*	**6.74**	0.58
X1.9	Short sea distance to main routes	5.80	1.24
X1.10	Short sea distance to feeder ports	5.52	1.30
X1.11	Further away sea distance to other hub ports	4.77	1.64
X1.12	Port's reputation	5.78	1.34
X1.13	Less competition with other modes of transport	4.61	1.59
X1.14	Less competition for shipping	4.54	1.46

Source: Author, *)chosen as top three priorities



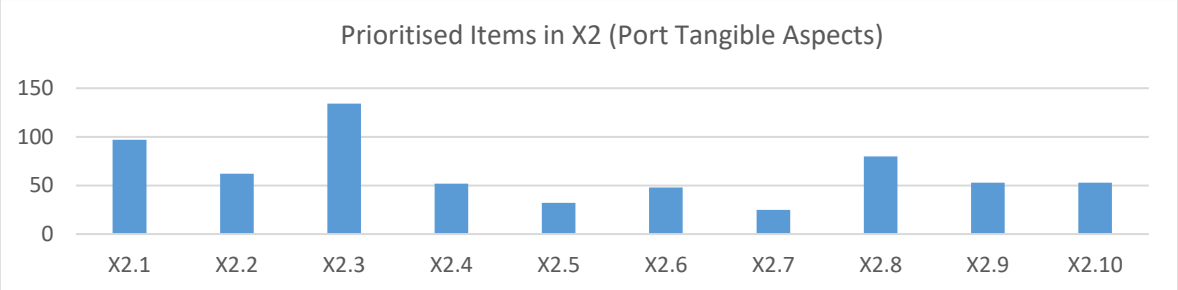
Source: Author

Figure 5.2 Three Prioritised Items in X1 (Port Convenience)

Table 5.9 Mean Value for Port Tangible Aspects

	Item Variable	Mean	S.D
X2.1	Depth of port channel and basin*	6.15	1.08
X2.2	Quay or berth length	6.19	1.00
X2.3	Cranes for loading-unloading*	**6.61**	0.71
X2.4	Container stacking yard	6.32	1.00
X2.5	Availability of other handling equipment	6.10	0.99
X2.6	Reliability of other handling equipment	6.12	0.94
X2.7	Storage space, warehouse, liquid bulk tank	6.02	0.97
X2.8	Overall port capacity*	**6.44**	0.89
X2.9	Standardised port infrastructure	6.35	0.92
X2.10	Continuous infrastructure upgrade	**6.45**	0.79

Source: Author, *)chosen as top three priorities



Source: Author

Figure 5.3 Three Prioritised Items in X2 (Port Tangible Aspects)

X3 - Port Intangible Aspects

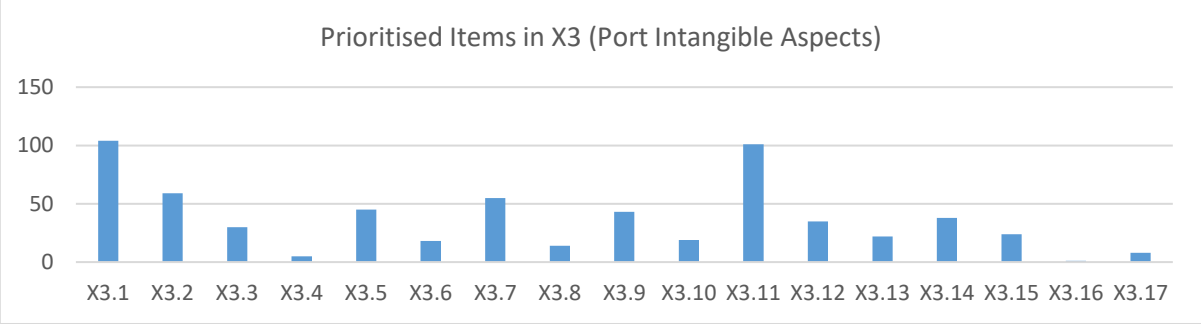
The following Table 5.10 describes the mean value and standard deviation for each item in variable X3 (Port Intangible Aspects). Items with the highest mean or importance are Communicative and responsive (X3.12), Standard quality of port management (X3.9) and Cargo tracking system (X3.13).

In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.4. Items most prioritised are Overall port efficiency (X3.1), Cargo handling efficiency (X3.2) and 24/7 service (X3.11). The lowest importance is item Incentives and promotions (X3.4). Meanwhile, respondents chose three different items as the top three priorities, they are: Overall port efficiency (X3.1), 24/7 service (X3.11), and Cargo handling efficiency (X3.2). Hence, their response is not consistent.

Table 5.10 Mean Value for Port Intangible Aspects

	Item Variable	Mean	S.D
X3.1	Overall port efficiency*	6.27	1.02
X3.2	Cargo handling efficiency*	6.32	0.96
X3.3	Low cargo damage	6.25	0.94
X3.4	Incentives and promotions	5.28	1.29
X3.5	Logistics services (warehousing, freight forwarding, LCL handling, etc.)	6.03	1.00
X3.6	Transhipment service (consolidate cargo from different origins to be sent to different destinations)	6.03	1.07
X3.7	IT ability (information and communication)	6.46	0.79
X3.8	Stability of port's labour	6.43	0.80
X3.9	Standard quality of port management	**6.50**	0.78
X3.10	Good management and labour relations	6.22	0.91
X3.11	24/7 service*	6.39	1.07
X3.12	Communicative and responsive	**6.58**	0.73
X3.13	Cargo tracking system	**6.47**	0.78
X3.14	Overall quality of human resource	6.45	0.74
X3.15	Financially profitable	6.22	1.07
X3.16	Developing/initiating containerisation facilities	5.83	1.12
X3.17	Other value added services (water, rubbish, bunkering, etc.)	5.74	1.19

Source: Author, *)chosen as top three priorities



Source: Author

Figure 5.4 Three Prioritised Items in X3 (Port Intangible Aspects)

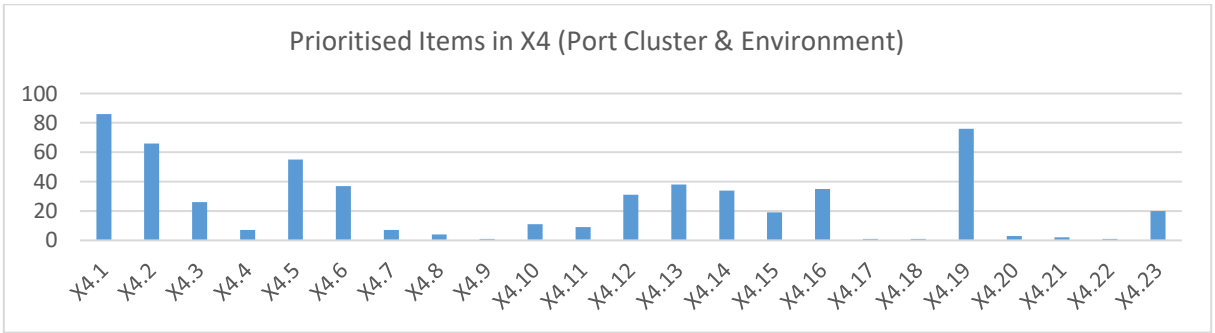
X4 - Port Cluster and Environment

The following Table 5.11 describes the mean value and standard deviation for each item in variable X4 (Port Cluster and Environment). Items with the highest mean or importance are Existing basic infrastructure – electricity, water, road (X4.19), Public road connecting surrounding cities to the port (X4.1) and Public road access to load centres from port (X4.13). The lowest importance is item Near tourism sites (X4.22). In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.5. Items most prioritised are Public road connecting surrounding cities to the port (X4.1), Existing basic infrastructure (X4.19), and Toll road connecting the port (X4.2). Respondents chose the same two items which they perceive as the top three priorities, they are X4.1 and X4.19. Another prioritised item is the Toll road connecting the port (X4.2). Hence, their response is partially consistent.

Table 5.11 Mean Value for Port Cluster and Environment

	Item Variable	Mean	S.D
X4.1	Public road connecting surrounding cities to the port*	**6.24**	0.98
X4.2	Toll road connecting the port*	6.13	1.07
X4.3	Railways connecting the port	5.69	1.21
X4.4	Waterway/river connecting the port	4.99	1.29
X4.5	Intermodal transport links	6.15	0.91
X4.6	Available land for port and logistics expansion	6.14	0.96
X4.7	Relatively cheap land	4.97	1.30
X4.8	Certain population size in metropolitan area near the port	4.74	1.26
X4.9	Certain size of metropolitan area near the port	4.78	1.30
X4.10	International forwarding agents	5.38	1.32
X4.11	Relatively cheap labour cost	5.00	1.25
X4.12	Load centres for inland cargo consolidation	5.91	0.97
X4.13	Public road access to load centres from port	**6.19**	0.98
X4.14	Special Economic Zones	5.50	1.29
X4.15	Sufficient hinterland (hinterland is the area served by the port)	5.61	1.16
X4.16	Market power, economic activity of hinterland	5.70	1.15
X4.17	Overlapping hinterland	4.27	1.46
X4.18	Expansion of foreland (foreland is the land area as destination served by the port)	5.21	1.19
X4.19	Existing basic infrastructure (electricity, water, road, etc.)*	**6.40**	0.83
X4.20	New local market	4.96	1.30
X4.21	Fertility of local land	3.87	1.54
X4.22	Near tourism sites	3.35	1.50
X4.23	New industrial sites	5.20	1.35

Source: Author, *)chosen as top three priorities



Source: Author

Figure 5.5 Three Prioritised Items in X4 (Port Cluster and Environment)

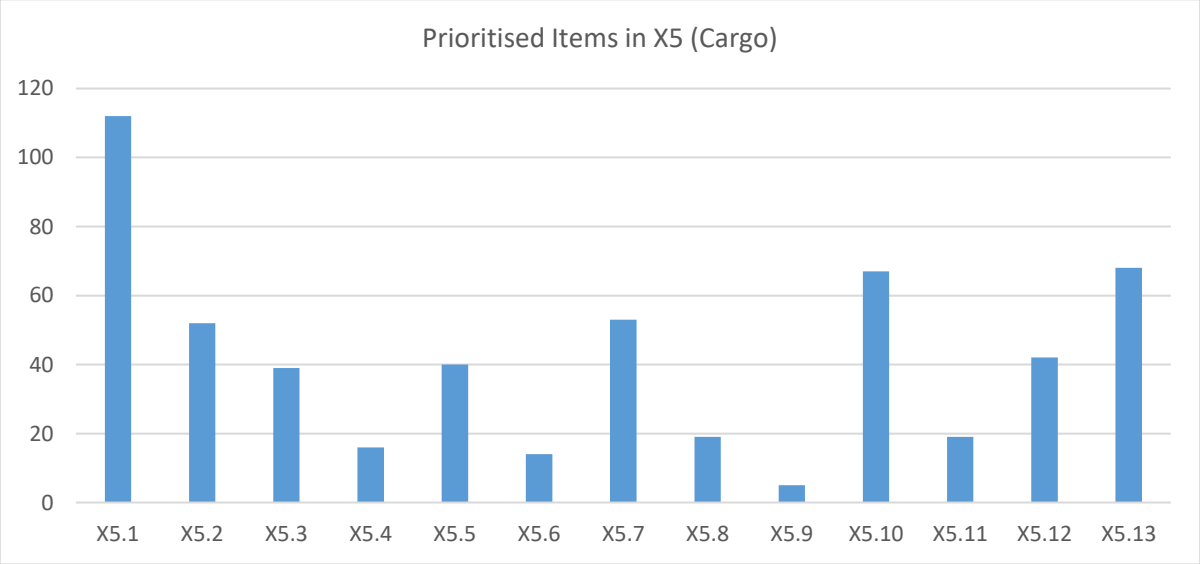
X5 – Cargo

The following Table 5.12 describes the mean value and standard deviation for each item in variable X5 (Cargo). Items with the highest mean or importance are Export cargo on continuous basis (X5.13), Transhipment cargo volume (X5.2) and Overall cargo volume (X5.1). The lowest importance is item Low value cargo (X5.9). In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.6. Items most prioritised are Overall cargo volume (X5.1), Mapping of cargo (X5.10), and Export cargo on continuous basis (X5.13). Respondents chose the same two items which they perceive as the top three priorities, they are X5.1 and X5.13. Another prioritised item is the Mapping of cargo (X5.10). Hence, their response is partially consistent.

Table 5.12 Mean Value for Cargo

	Item Variable	Mean	S.D
X5.1	Overall cargo volume*	**6.02**	1.08
X5.2	Transhipment cargo volume (consolidated cargo from different origins to be sent to different destinations)	**6.03**	1.07
X5.3	Container cargo volume	5.89	1.10
X5.4	Local cargo volume	5.74	1.01
X5.5	Increasing need for container transhipment	5.84	1.08
X5.6	Niche market, specialised cargo volume	5.13	1.13
X5.7	Economies of scale from increased cargo throughput	5.79	1.07
X5.8	High value cargo	4.88	1.36
X5.9	Low value cargo	4.63	1.35
X5.10	Mapping of cargo*	5.64	1.09
X5.11	Availability of natural resource cargo	5.24	1.34
X5.12	Availability of raw material cargo for industry/manufacturing	5.67	1.18
X5.13	Export cargo on continuous basis*	**6.07**	0.99

Source: Author, *)chosen as top three priorities



Source: Author

Figure 5.6 Three Prioritised Items in X5 (Cargo)

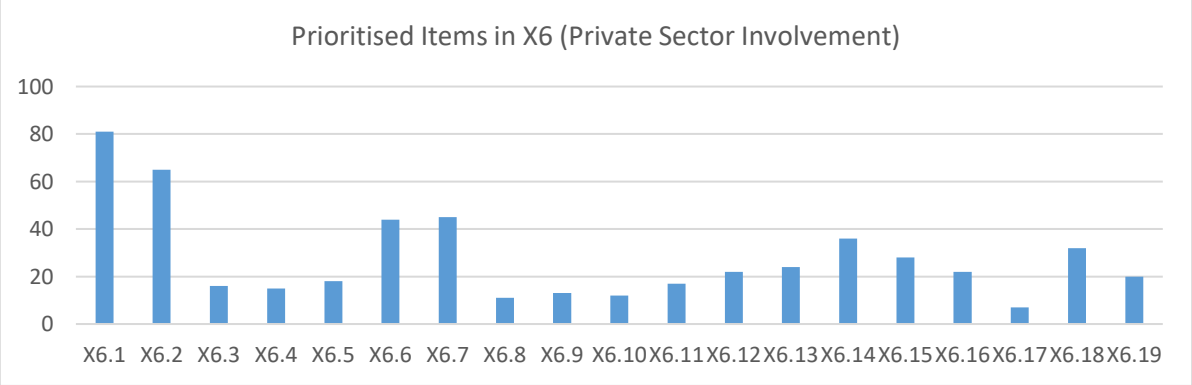
X6 – Private Sector Involvement

The following Table 5.13 describes the mean value and standard deviation for each item in variable X6 (Private Sector Involvement). Items with the highest mean or importance are Strong relations between port/port authority and shipping (X6.7), Sound investment system (X6.2) and Strategy of international port operators (X6.6). The lowest importance is item Private sector involvement in port ownership (X6.8). In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.7. Items most prioritised are Private sector involvement in operations (X6.1), Sound investment system (X6.2) and Strong relations between port/port authority and shipping (X6.7). Respondents chose the same two items which they perceive as the top three priorities, they are X6.2 and X6.7. Another prioritised item is the Private sector involvement in operations (X6.1). Hence, their response is partially consistent.

Table 5.13 Mean Value for Private Sector Involvement

	Item Variable	Mean	S.D
X6.1	Private sector involvement in operations (concession, leasehold, Build Operate Transfer, etc.)*	5.76	1.26
X6.2	Sound investment system*	**6.13**	1.01
X6.3	Financial assistance for investing companies	5.65	1.20
X6.4	Exclusive contracts policy for dedicated terminal	5.50	1.21
X6.5	Concentration of investment	5.56	1.21
X6.6	Strategy of international port operators	**6.01**	1.08
X6.7	Strong relations between port/port authority and shipping*	**6.25**	0.98
X6.8	Private sector involvement in port ownership/port devolution	4.98	1.44
X6.9	Shipping involvement in terminal	5.42	1.22
X6.10	Shipping alliance formation	5.43	1.19
X6.11	Not over investing	5.07	1.16
X6.12	Local entrepreneurship	5.49	1.19
X6.13	Collaboration with local industries	5.73	1.17
X6.14	Collaboration with shipping lines	5.93	1.02
X6.15	Clear phases of investment (time and amount of investments)	5.65	1.20
X6.16	Involve in Corporate Social Responsibility (CSR) programmes	5.54	1.24
X6.17	Incentives for first local partners	5.36	1.26
X6.18	Less monopoly	5.44	1.36
X6.19	Private sector involvement in National Planning	5.41	1.30

Source: Author, *)chosen as top three priorities



Source: Author

Figure 5.7 Three Prioritised Items in X6 (Private Sector Involvement)

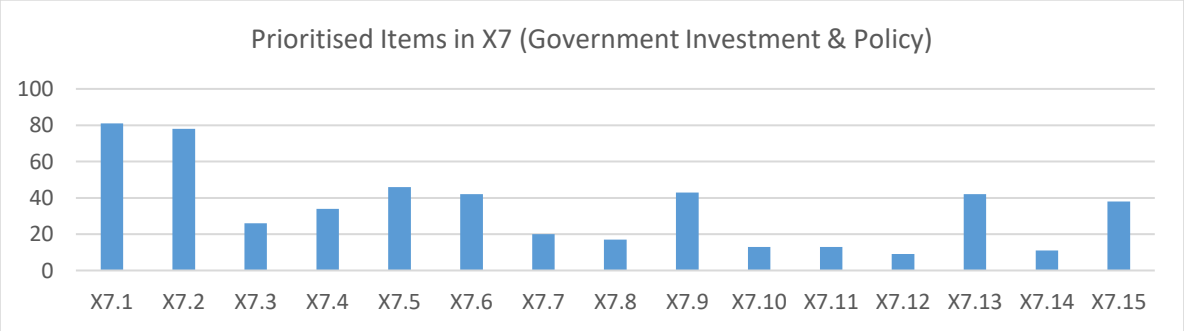
X7 – Government Investment and Policy

The following Table 5.14 describes the mean value and standard deviation for each item in variable X7 (Government Investment and Policy). Items with the highest mean or importance are Supported by national planning for port and logistics (X7.2), Supported by export import and international policy (X7.6) and Supported by customs regulation (X7.5). The lowest importance is item Specific policy – fishing moratorium, archipelagic sea lanes (X7.12). In addition, respondents are also asked to choose 3 item variables as their most prioritised. The frequency of these three items prioritised are shown in Figure 5.8. Items most prioritised are Government policy to prioritise peripheral ports (X7.1), Supported by national planning for port and logistics (X7.2) and Supported by customs regulation (X7.5). Respondents chose the same two items which they perceive as the top three priorities, they are X7.2 and X7.5. Another prioritised item is the Government policy to prioritise peripheral ports (X7.1). Hence, their response is partially consistent.

Table 5.14 Mean Value for Government Investment and Policy

	Item Variable	Mean	S.D
X7.1	Government policy to prioritise peripheral ports*	6.04	1.05
X7.2	Supported by national planning for port and logistics*	**6.40**	0.89
X7.3	Supported by local and provincial government planning	6.33	0.94
X7.4	Political stability	6.07	1.18
X7.5	Supported by customs regulation*	**6.34**	0.95
X7.6	Supported by export import and international trade policy	**6.39**	1.00
X7.7	Tax cut/ exemption	5.67	1.23
X7.8	Efficient local and provincial government administration	6.14	0.99
X7.9	Active interface between Port Authority (regulator) and port operator	6.29	0.95
X7.10	Local and provincial government initiative	5.80	1.14
X7.11	Aligned with cabotage law/ protectionism	5.94	1.17
X7.12	Specific policy (e.g. fishing moratorium, archipelagic sea lanes)	5.53	1.29
X7.13	Less bureaucracy	6.13	1.21
X7.14	Central Government initiatives (e.g. subsidy)	5.93	1.10
X7.15	Central government coordination with local/provincial government and private sector	6.16	0.97

Source: Author, *)chosen as top three priorities



Source: Author

Figure 5.8 Three Prioritised Items in X7 (Government Investment and Policy)

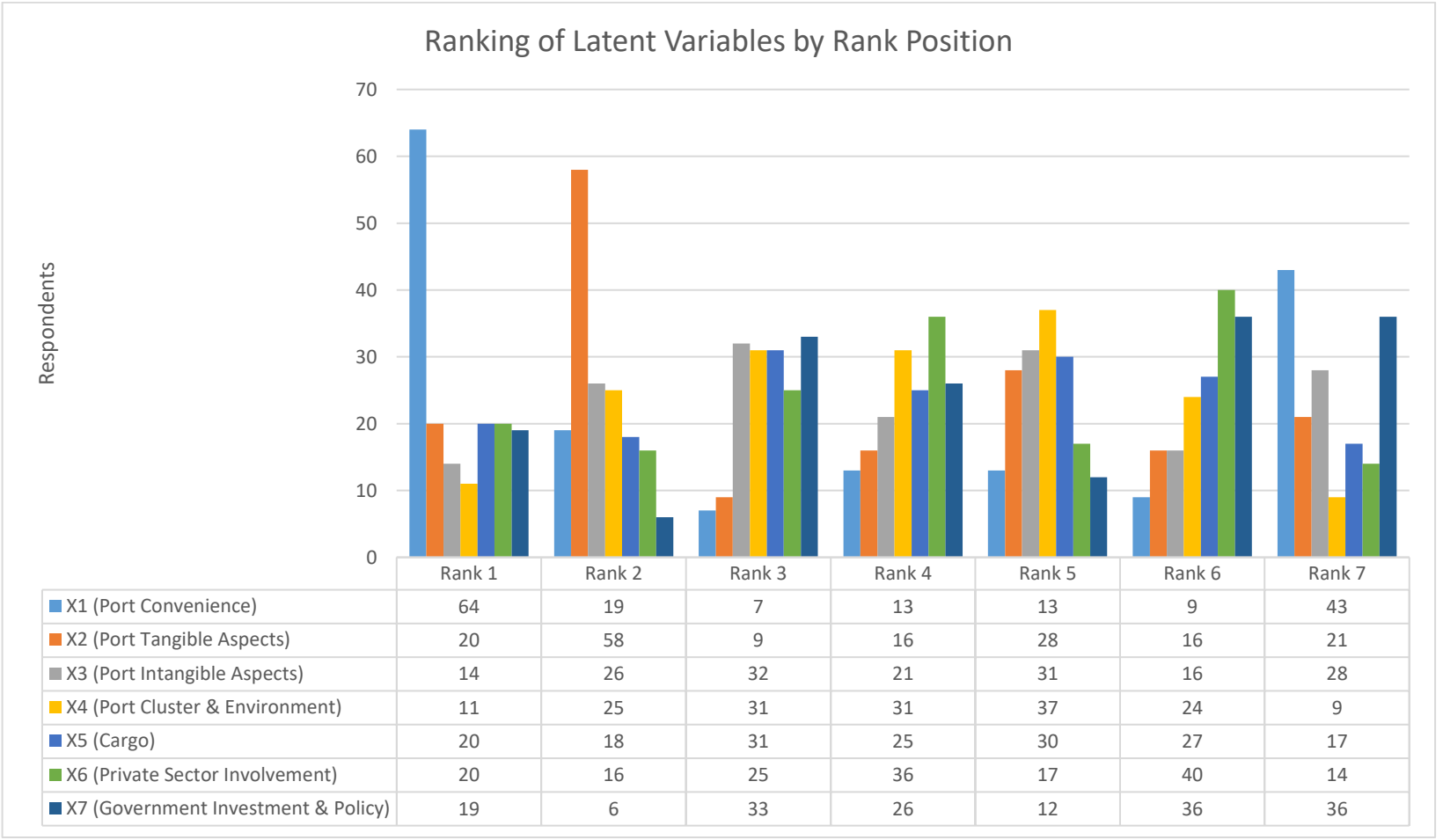
Latent Variable Ranking X1 to X7

The following Figure 5.9 describes responses on the ranking of latent variables X1 to X7. It shows the ranking by rank position. Most respondents perceive port convenience as the 1st priority (64 people), followed by port tangible aspects as the 2nd priority (58 people). Meanwhile, the least respondents perceive port cluster and environment as the 1st priority (11 people), followed by government investment and policy as 2nd priority (6 people). However, it is confusing that most respondents also perceive port convenience as the 7th rank position (43 people). This shows that respondents have divided perception on port convenience, where it could be the most and the least important variable.

The 64 respondents who perceived port convenience as first rank mostly consists of cargo owners (22), shipping lines (15) and logistics companies (11). On the opposite side, the 43 respondents who perceived port convenience as 7th rank mostly consists of port operators (15) and logistics companies (12). Hence, this shows that logistics companies are the ones who has divided perception on port convenience. It might be influenced by the the type of cargo they carry, respondents' years of working or ownership of the logistics company they work in. Moreover, the 58 respondents who perceived port tangible aspects as second rank mostly consists of cargo owners (17) and shipping lines (12). It can also be seen from Figure 5.9 that government investment and policy is mostly perceived in the 7th rank position (by 36 people). This might mean that overall stakeholders do not expect much on that variable to develop a peripheral port as hub port.

5.2.2 Descriptive Statistics by Stakeholder Type

Descriptive statistics for each item variables explained in the previous section, Section 5.2.1, are compiled in Table 5.15. It shows the prioritised items with high mean, either they are the 3 highest mean or chosen as top three priorities. In terms of port convenience, respondents perceive the most important is that peripheral port needs to have available sea routes to be accessed, customs integration, safety and security. In terms of port tangible aspects, items perceived most important are depth of port, cranes and overall port capacity. In terms of port intangible aspects, items perceived most important are overall port efficiency, carog handling efficiency, standard quality of port management, 24/7 service, communicative and responsive, and cargo tracking system.



	Rank 1	Rank 2	Rank 3	Rank 4	Rank 5	Rank 6	Rank 7
X1 (Port Convenience)	64	19	7	13	13	9	43
X2 (Port Tangible Aspects)	20	58	9	16	28	16	21
X3 (Port Intangible Aspects)	14	26	32	21	31	16	28
X4 (Port Cluster & Environment)	11	25	31	31	37	24	9
X5 (Cargo)	20	18	31	25	30	27	17
X6 (Private Sector Involvement)	20	16	25	36	17	40	14
X7 (Government Investment & Policy)	19	6	33	26	12	36	36

Source: Author

Figure 5.9 Ranking of Latent Variables by Rank Position

In terms of port cluster and environment, items perceived most important are public road connection, toll road, public road access to load centres from port, and existing basic infrastructure (electricity, water, road, etc.). In terms of cargo, items perceived most important are overall cargo volume, transhipment cargo volume, mapping of cargo, and export cargo on continuous basis. In terms of private sector involvement, items perceived most important are private sector involvement in operations, sound investment system, strategy of international port operators, and strong relations between port/port authority and shipping. Lastly, in terms of government investment and policy, items perceived most important are government policy to prioritise peripheral ports, supported by national planning for port and logistics, supported by customs regulation and supported by export-import and international trade policy.

Table 5.15 Mean Value for Prioritised Items in Variable X1 to X7

Var	Code	Item Variable	Mean	S.D
X1	X1.3	Available sea routes*	**6.44**	0.83
	X1.6	Customs integration*	**6.44**	0.95
	X1.8	Safety and security*	**6.74**	0.58
X2	X2.1	Depth of port channel and basin*	6.15	1.08
	X2.3	Cranes for loading-unloading*	**6.61**	0.71
	X2.8	Overall port capacity*	**6.44**	0.89
	X2.10	Continuous infrastructure upgrade	**6.45**	0.79
X3	X3.1	Overall port efficiency*	6.27	1.02
	X3.2	Cargo handling efficiency*	6.32	0.96
	X3.9	Standard quality of port management	**6.50**	0.78
	X3.11	24/7 service*	6.39	1.07
	X3.12	Communicative and responsive	**6.58**	0.73
	X3.13	Cargo tracking system	**6.47**	0.78
X4	X4.1	Public road connecting surrounding cities to the port*	**6.24**	0.98
	X4.2	Toll road connecting the port*	6.13	1.07
	X4.13	Public road access to load centres from port	**6.19**	0.98
	X4.19	Existing basic infrastructure (electricity, water, road, etc.)*	**6.40**	0.83
X5	X5.1	Overall cargo volume*	**6.02**	1.08
	X5.2	Transhipment cargo volume (consolidated cargo from different origins to be sent to different destinations)	**6.03**	1.07
	X5.10	Mapping of cargo*	5.64	1.09
	X5.13	Export cargo on continuous basis*	**6.07**	0.99
X6	X6.1	Private sector involvement in operations (concession, leasehold, Build Operate Transfer, etc.)*	5.76	1.26
	X6.2	Sound investment system*	**6.13**	1.01
	X6.6	Strategy of international port operators	**6.01**	1.08
	X6.7	Strong relations between port/port authority and shipping*	**6.25**	0.98
X7	X7.1	Government policy to prioritise peripheral ports*	6.04	1.05
	X7.2	Supported by national planning for port and logistics*	**6.40**	0.89
	X7.5	Supported by customs regulation*	**6.34**	0.95
	X7.6	Supported by export import and international trade policy	**6.39**	1.00

Source: Author, *)chosen as top three priorities

When these item variables' average values are broken down by stakeholder type, compiled in Table 5.16, it is seen that there is a little bit of differences. Items perceived as the most important for shipping lines, cargo owners, and logistics companies is safety and security (X1.8); while for local government is good management and labour relations (X3.10). These items are not perceived the highest average of importance in Table 5.15. The rest of the staekholders has important item variables inline with items in Table 5.15, which are: cranes (X2.3) for port

operators; port capacity (X2.8) for central government; standard quality of port management (X3.9) for stakeholder-others; lastly 10 item variables with the same mean value for funding institutions.

Table 5.16 Mean Value for Prioritised Items in Variable X1 to X7 by Stakeholder Type

Stakeholder	Rank	Code	Average score
PO	1	X2.3	6.62
	2	X7.6	6.55
	3	X3.7	6.52
	4	X3.9	6.48
	5	X1.3	6.45
	6	X5.2	6.45
	7	X3.11	6.45
	8	X1.8	6.41
	9	X2.1	6.41
	10	X3.12	6.41
	11	X7.2	6.41
SL	1	X1.8	6.88
	2	X2.3	6.81
	3	X2.10	6.73
	4	X2.1	6.69
	5	X4.19	6.65
	6	X1.3	6.62
	7	X1.6	6.62
	8	X1.7	6.62
	9	X3.12	6.62
	10	X7.9	6.62
CO	1	X1.8	6.80
	2	X3.12	6.69
	3	X2.3	6.65
	4	X1.6	6.63
	5	X3.9	6.57
	6	X3.14	6.57
	7	X7.6	6.57
	8	X2.10	6.55
	9	X2.4	6.53
	10	X3.2	6.53
	11	X3.13	6.53
	12	X3.15	6.53
CG	1	X2.8	6.93
	2	X7.3	6.86
	3	X7.2	6.79
	4	X3.12	6.79
	5	X1.6	6.71
	6	X1.8	6.71
	7	X3.9	6.71
	8	X3.7	6.71
	9	X2.3	6.64
	10	X2.9	6.64
	11	X2.10	6.64
	12	X3.1	6.64
	13	X3.8	6.64
	14	X3.13	6.64
	15	X3.14	6.64

Stakeholder	Rank	Code	Average score
LC	1	X1.8	6.69
	2	X2.3	6.50
	3	X3.13	6.50
	4	X2.4	6.42
	5	X2.8	6.42
	6	X3.7	6.35
	7	X3.12	6.35
	8	X3.14	6.35
	9	X3.11	6.31
	10	X1.3	6.27
	11	X3.8	6.27
LG	1	X3.10	7.00
	2	X1.1	6.67
	3	X1.3	6.67
	4	X1.6	6.67
	5	X1.8	6.67
	6	X1.12	6.67
	7	X2.8	6.67
	8	X3.7	6.67
	9	X3.8	6.67
	10	X3.9	6.67
	11	X3.13	6.67
	12	X4.1	6.67
	13	X4.13	6.67
	14	X4.19	6.67
	15	X6.1	6.67
	16	X6.2	6.67
	17	X6.16	6.67
	18	X7.11	6.67
	19	X7.15	6.67
FI	1	X1.3	6.80
	2	X1.8	6.80
	3	X2.2	6.80
	4	X2.3	6.80
	5	X3.1	6.80
	6	X3.13	6.80
	7	X3.14	6.80
	8	X5.10	6.80
	9	X7.4	6.80
	10	X7.5	6.80
Others	1	X1.8	7.00
	2	X3.9	6.79
	3	X3.12	6.74
	4	X1.3	6.68
	5	X3.13	6.68
	6	X3.8	6.63
	7	X2.9	6.58
	8	X3.7	6.58
	9	X6.2	6.58
	10	X7.2	6.53
	11	X7.3	6.53

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

5.2.3 Exploratory Factor Analysis (EFA)

EFA is used to investigate the underlying structure which explains what is needed for a peripheral port to become a hub port (see Section 3.3.4). Procedures conducted are summarised in Table 5.17.

Table 5.17 Procedures in Exploratory Factor Analysis (EFA)

No.	Procedures and Tests	Requirements	Results in this study	Interpretation
1.	Factor Extraction Method	It should be decided to choose between Principle components analysis (PCA) or Common Factor Analysis (CFA), which differ in whether total variance or common variance is analysed (Hair et al. 2010, pp.106-107).	PCA is used because it is better for research focusing on data reduction.	PCA is used in the IMB SPSS 23 software.
2.	Initial Unrotated Results	• Total variance explained • Communalities	Communalities are above 0.50	Acceptable.
3.	Determine Rotational Method	It should be decided to choose which rotational method to be used (Hair et al. 2010, pp.112-116). • Total variance explained • Communalities • Rotated component matrix	Varimax (Orthogonal) is used because the structure is fundamentally simple and give a clearer separation of factors.	
4.	Determine the number of factors as output	These values are used as considerations (Hair et al. 2010, p.111). • Scree Plot • Factors with eigenvalues greater than 1.0 • Enough factors to meet a specified percentage of variance explained, usually 60% or higher • No cross loadings	After comparing several alternatives, it is determined that having a 3 factor is the best choice.	111 items are now reduced into 3 factors with 66 items.
5.	Results of Varimax 3-Factors	EFA results are explaind by these output (Hair et al. 2010, pp.116-122). • Total variance explained • Factor Loadings • Reproduced correlation matrix showing non-redundant residuals less than 50%, explained in Field (2018, p.812)	Adequate results which fulfilled the minimum requirements.	Acceptable
6.	Validity and Reliabilty	Validity and reliability are explaind by these output (Hair et al. 2010, pp.125-126, pp.708-710): • Scale reliability: Alpha Cronbach >0.7 • Convergent validity: Factor loading >0.5; CR>0.7; AVE>0.5 • Discriminant validity: No strong cross-loading • Nomological validity: makes sense based on theory	Factor Loadings for the items varies between 0.3 to 0.7. Alpha Cronbach is between 0.8 to 0.9. AVE is between 0.2 to 0.3. CR is between 0.8 to 0.9	Factor loading are acceptable as it is an early exploratory research. The model is considered reliable and valid.

Source: Author

Factor Extraction Method: Principal Component Analysis

There are two main factor extraction method, which is Principal Component Analysis (PCA) and Common Factor Analysis (CFA). They differ in whether total variance or common variance is analysed. PCA uses total variance, which consist of proportions of unique variance and error variance, to derive factors (Hair et al. 2010, pp.106-107). Meanwhile, CFA only uses common or shared variance. Practically, these two differ based on the purpose of conducting exploratory factor analysis in the first place. PCA is most appropriate for research focusing on data reduction and prior knowledge suggest specific and error variance are relatively small of the total variance. On the other hand, CFA has more restrictive assumptions, which is most appropriate for research focusing on identifying latent dimensions, little knowledge is known on the specific and error variance and consider eliminating it (Hair et al. 2010, pp.106-107). These two methods are debatable, however, some empirical research suggests that both methods will arrive at identical results if the number of variables exceeds 30 or the communalities exceed 0.60 for most variables (Hair et al. 2010, p.107). Hence, in this thesis the method chosen is PCA.

Initial Unrotated Results

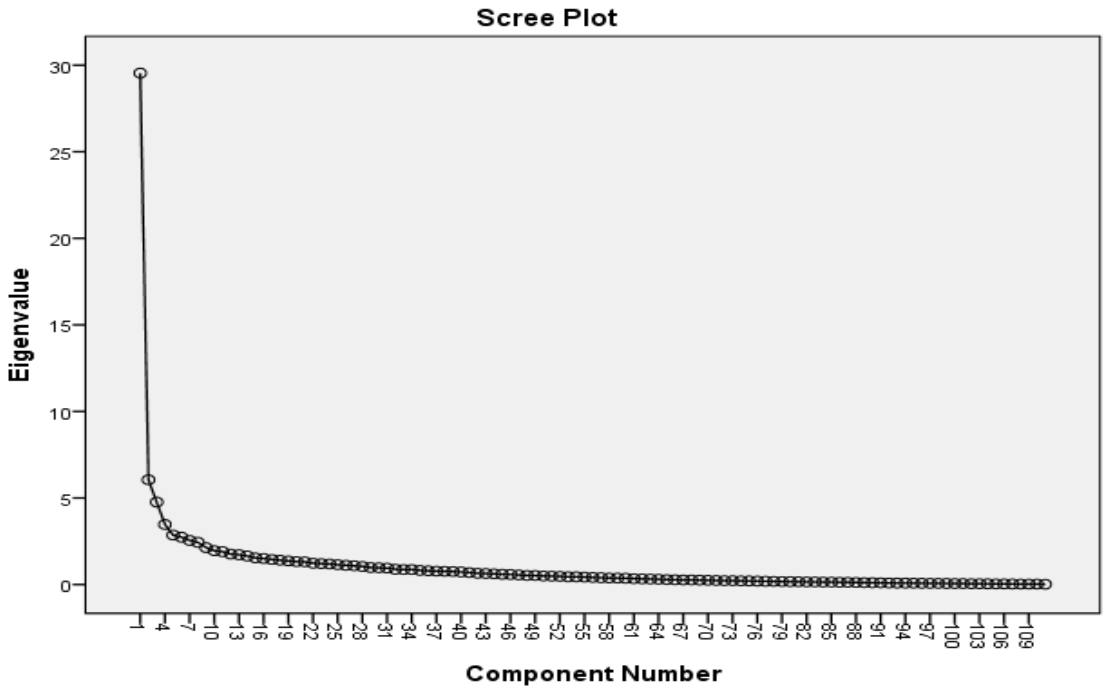
After PCA – EFA is run in IBM SPSS 23, result shows without rotation the 111 item variables are grouped into 28 factors, with a total variance explained of 75.158% (see Appendix 6). Moreover, communalities value should be considered because it shows how much of the variance in each item is explained, where a value below 0.3 means the item does not fit well with oher items in its component (Pallant 2016, p.200). Result shows communalities for all items are above 0.6, with the lowest communalities score of 0.617. Initial unrotated results also provides a scree plot. It is a diagram which shows the optimum number of factors that can be extracted when the amount of unique variance begins to dominate common variance (Hair et al. 2010, pp.110-111). It is represented by a curve turning into a straight line. Scree plot result in Figure 5.10, revealed a clear break between the 3rd and 4th component, hence, it suggested to have 3 or 4 factors.

Rotational Method: Varimax

After running initial unrotated EFA, researchers should run rotational methods by having the reference axes of the factors turned from the origin, to achieve a simpler model, improve interpretation and gain theoretically meaningful pattern (Hair et al. 2010, pp.112-116). Two ways of rotating an EFA model are oblique and orthogonal rotation. The difference between them are that oblique solution is more flexible and provides additional information about the extent to which the factors correlate with each other (Hair et al. 2010, p.114). On the other hand, orthogonal rotation can be conducted in 3 different approaches: quartimax, varimax and

equimax. Among the 3 approaches, varimax is commonly used because it has a simple structure and enables the researcher to achive a clear cut, between positive or negative association of the item variable and factor (Hair et al. 2010, p.115).

In this thesis, both methods direct oblimin (oblique) rotation and varimax (orthogonal) rotation for 3 factors are conducted and results are compared with each other. Result shows that there are more item variables (94 items) in the oblique rotation compared to the varimax orthogonal rotation (66 items). Moreover, in the oblique results, it is seen that correlation between extracted factors are low (not more than 0.6 correlation value) as described in Table 5.18. Pedhazur and Schemelkin (1991) suggested that if correlation between extracted factor is low, then it is better to use the orthogonal rotation solution (cited in Field 2018, p.794). This means that the oblique rotation is not providing beneficial information on correlation between extracted factors. Hence, it is better to use varimax results.



Source: Author, from results in IBM SPSS 23

Figure 5.10 Scree Plot to Determine Number of Factors

Table 5.18 Results of Direct Oblimin (Oblique) Rotation

Component Correlation Matrix

Component	1	2	3
1	1.000	.282	-.515
2	.282	1.000	-.327
3	-.515	-.327	1.000

Extraction Method: Principal Component Analysis.
Rotation Method: Oblimin with Kaiser Normalization.

Source: Author, from results in IBM SPSS 23

Decisions on Number of Factors

Decision on the number of factors to be retained should be based on these considerations (Hair et al. 2010, p.111): 1) Factors with eigenvalues greater than 1.0; 2) Predetermined based on research objectives and/or prior research; 3) Enough factors to meet a specified cumulative percentage of variance explained, which is commonly 60% or higher; 4) Factors shown by the scree test to have substantial amounts of common variance, which are factors before inflection point; 5) Comparison of several alternative solutions to ensure the best structure is identified, such as one more and one less factor than the initial solution.

Initial eigenvalues greater than 1.0 resulted in 28 factors which is too many to be understood (see Appendix 6). Literature review suggest there are 7 latent variables (Chapter 3). Hence, reason (1) and (2) has been considered. Therefore, reason number (3), (4) and (5) are to be examined further. The scree plot in Figure 5.10 describes an infliction point at around 3 or 4 factors. Hence, comparisons are made for EFA results between 3 to 8 factors (all rotated with Varimax), as shown in Table 5.19. It is seen that the more factors extracted, then the higher cumulative variance explained, which is good because it shows the derived factors explains at least a specified amount of variance % (Hair et al. 2010, p.109).

Table 5.19 Comparison of Results on the Number of Factors to Extract

Number of factors	Item Variables remaining*	Cummulative variance explained (%)	Alpha cronbach							
			F1	F2	F3	F4	F5	F6	F7	F8
3	66 items	36.35	0.93	0.88	0.89	-	-	-	-	-
4	60 items	39.47	0.93	0.87	0.88	0.36	-	-	-	-
5	54 items	42.05	0.92	0.92	0.83	-	0.54	-	-	-
6	62 items	44.51	0.92	0.92	0.80	0.57	0.47		-	-
7	59 items	46.81	0.91	0.92	0.76	0.58	0.61	0.72	0.62	-
8	58 items	49.01	0.92	0.87	0.61	0.76	0.78	0.78	0.71	0.71

Source: Author, *) factor loadings >0.3 and no crossloadings, details in Appendix 6

However, the more factors extracted then the lesser the Alpha Cronbach will be. Alpha Cronbach represents reliability of the model (Dunn et al. 1994; Fink and Kosecoff 1998; Sekaran 2003), which will be further explained in Section 5.2.4. When 3 number of factors are retained, alpha cronbach are optimised above 0.80 for each factor and 66 item variables are kept explaining the factors. Results shows a cumulative variance explained of 36.35%, which is under 60% and considered a bit low. This is still acceptable because cumulative variance explained for studies in the social sciences has information which is often less precise compared to natural sciences (Hair et al. 2010, p.109). In addition, this is still appropriate since this research is still in an

exploratory phase and not confirmatory. Hence, finally the 3 number of factor model is chosen as the best choice.

5.2.4 Results of Varimax 3-Factors

There are 66 items retained in the Varimax 3-factors model, while the rest of the 45 items are deleted due to having factor loadings < 0.3 and having cross-loadings (will be explained further in Section 6.3.3). Factor loadings explains the correlation between each variable and the factors they are grouped into, in other words the degree of correspondence. The higher the loadings are means the item variable is a better representative of the factor (Hair et al. 2010, p.112). It is acceptable for an exploratory research to have factor loadings between 0.30 to 0.70, since factors loadings between ±.30 to ±.40 are considered to meet the minimal level for interpretation of structure (Hair et al. 2010, p.117). Detailed factor loadings for each item variales are shown in Table 5.21. The 3-Factor model also resulted in a reproduced correlation matrix, which shows non-redundant residuals between observed and reproduced correlations of 42%. Field (2018, p.812) stated that some percentage of non-redundant residuals is accepted as long as its below 50%.

Reliability and Validity of the EFA 3-Factors Model

This section provides reliability and validity tests which are conducted after EFA, as explained in Section 3.3.5. First, on reliability or internal consistency. Scale reliability of the model is shown from its Alpha Cronbach >0.7 (Hair et al. 2010, pp.125-126; Field 2018, pp.821-825). Results from IBM SPSS indicated a reliable model as seen in Table 5.20 because the condition has been met.

Table 5.20 Reliability and Validiy Tests for the EFA Varimax - 3 Factors

Conditions for a Reliable and Valid EFA Model	F1	F2	F3
Reliability Tests			
• Alpha Cronbach >0.7	0.93	0.88	0.89
Convergent Validity Tests			
• Factor loading >0.5	Ranged from 0.308 to 0.673	Ranged from 0.374 to 0.694	Ranged from 0.318 to 0.705
• Composite Reliability (CR) >0.7	0.92	0.87	0.88
• Average Variance Extracted (AVE) >0.5	0.30	0.31	0.26
Discriminant Vaidity Tests			
• No strong cross-loadings	Yes	Yes	Yes
Nomological Validity test			
• Item variables in the factors make sense based on theory/literature	Yes	Yes	Yes

Source: Author

Second, on validity. Convergent validity of the model is shown from its Factor loadings >0.5, Construct Reliability (CR) >0.7 and Average Variance Extracted (AVE) >0.5 (Hair et al. 2010, pp.708-710; Grande 2016). These three measurements to examine convergent validity are adapted from CFA and SEM. Factor loadings for CFA and SEM are ideally 0.7 and above, or a standardised loading is approximately 0.5. A loading of 0.71 when squared is equal to 0.5, which means the factor explains half of the variation in the item with the other half being error variance (Hair et al. 2010, p.709). CR is calculated from the squared sum of factor loadings (L_i) for each construct and the sum of the eror variance terms for a construct (e_i) (Hair et al. 2010, pp.708-710; Grande 2016). The equation to calculate CR is as follows.

$$\mathrm{CR} = \frac{(\sum_{i=1}^{n} L_i)^2}{(\sum_{i=1}^{n} L_i)^2 + (\sum_{i=1}^{n} e_i)}$$

Meanwhile, AVE indicates convergence, calculated as the mean variance extracted for the items loading on a construct (Hair et al. 2010, pp.708-710; Grande 2016). The equation to calculalte AVE is as follows.

$$\mathrm{AVE} = \frac{\sum_{i-1}^{n} {L_i}^2}{n}$$

Results indicated a convergent valid model as seen in Table 6.22 because these conditions have been met, except for AVE which is weak around 0.3. An AVE of less than 0.5 indicates that, on average, more error remains in the items than variance explained by the latent factor structure imposed on the measure (Hair et al. 2010, p.709).

In terms of discriminant validity, it can be examined from the existence of cross-loadings, while nomological validity from its alignment with theory or literature (Hair et al. 2010, p.710). All item variables having cross-loadings has been deleted. Hence, discriminant validity is met and each of the factors has represented different concepts (Sekaran 2003, pp.307-308). Lastly, nomological validity is met with interpretation of each factors in the next section.

Another way to examine validity of an EFA model is by doing a Split Sample Analysis (Hair et al. 2010, pp.139-140). This is done by having the total 171 responses broken down into two groups, the early responses and the late responses (in Section 3.3.4). Results indicates that there is slightly different variance explained and items retained, as seen in Figure 5.11. Overall, the split sample analysis shows no major differences and non-response bias test also shows no significant differences between early and late responses. Hence, the model is considered valid. Criterion-related validity is not done here. As explained in Section 3.3.5, criterion-related

validity means the model could predict and differentiate participants who are known to be different (Dunn et al. 1994; Sekaran 2003). This is not tested here since the purpose of EFA in the thesis is not to differentiate stakeholders.

Early Responses	Late Responses	Overall Responses
•total variance explained 39.00%	•total variance explained 36.60%	•total variance explained 36.35%
•61 items in the model	•62 items in the model	•66 items in the model
•21 items in F1	•28 items in F1	•29 items in F1
•22 items in F2	•18 items in F2	•15 items in F2
•18 items in F3	•16 items in F3	•22 items in F3

Figure 5.11 Split Sample Analysis for the EFA Varimax - 3 Factors

Item Variables in the EFA 3-Factors Model

There is a total of 66 item variables in the EFA 3-Factors model, as compiled in Table 5.21. The first factor (F1) includes 6 item variables from Port Convenience (X1), 9 items from Port Tangible Aspects (X2), 10 items from Port Intangible Aspects (X3), 2 items from Port cluster and environment (X4) and 2 items from Cargo (X5). These items are related to the standard requirement of a hub port, hence, F1 is renamed as ***Standardised Port Operations***. The second factor (F2) includes 10 items from Private Sector Involvement (X6) and 5 items from Government Investment and Policy. These items are related to private sector and government policies which support the establishment of a hub port, hence, F2 is renamed as ***Clear policy, financed and governance***. The third factor (F3) includes 3 items from Port Convenience (X1), 1 item from Port Intangible Aspects (X3), 15 items from Port cluster and environment (X4) and 3 items from Cargo (X5). These items are related to the port cluster, environment, hinterland and other aspects which brings additional value of a hub port, hence, F3 is renamed as ***Positive spatial aspects.***

5.2.5 Comparing Median of F1, F2 and F3 using Non-Parametric Tests

Tests to compare median is used to investigate how stakeholders' put their priorities towards the factors identified from EFA. It is conducted to answer the 3rd research question of the thesis. Before comparing median, decision should be made to choose on which results of the EFA is used to represent the three factors. Hair et al. (2010, p.144) explained that there are three alternatives to further analysis of EFA results which are by replacing the original variables with either one of these values: a) surrogate variables, b) factor scores, c) summated scales.

Table 5.21 Item Variables in the EFA Results (Varimax 3-Factors)

Factor-1 (F1)			Factor-2 (F2)			Factor-3 (F3)		
Code	**Item Variables**	**Factor Loadings**	**Code**	**Item Variables**	**Factor Loadings**	**Code**	**Item Variables**	**Factor Loadings**
X1.3	Available sea routes	.541	X6.1	Foreign sector involvement	.590	X1.11	Sea distance to hub ports	.357
X1.4	Low congestion	.451	X6.2	Sound investment system	.694	*X1.13**	*Less competition with other modes of transport*	.445
X1.6	Customs integration	.585	X6.3	Financial assistance for investing companies	.577	*X1.14**	*Less competition with shipping*	.420
X1.7	Natural depth	.363	X6.4	Exclusive contracts policy for dedicated terminal	.483	*X3.17**	*Other value-added services (water, rubbish, bunkering)*	.318
X1.8	Safety and security	.581	X6.6	Strategy of international operators	.562	X4.4	Waterway/river connecting the port	.409
X1.12	Port's reputation	.522	X6.10	Shipping alliance formation	.603	X4.7	Relatively cheap land	.467
X2.2	Quay / berth length	.427	*X6.14**	*Collaboration with shipping line*	.627	X4.8	Certain population metropolitan area	.552
X2.3	Cranes	.604	*X6.15**	*Clear phases of investment (time and amount of investment)*	.563	X4.9	Certain surface metropolitan area	.586
X2.4	Container stacking yard	.616	*X6.16**	*Involve in CSR programmes*	.581	X4.10	International forwarding agents	.486
X2.5	Availability of other handling equipment	.670	*X6.18**	*Less monopoly*	.374	X4.11	Relatively cheap labour cost	.546
X2.6	Reliability of other handling equipment	.610	X7.1	Gov policy to prioritise peripheral ports	.511	X4.14	Special economic zone	.416
X2.7	Storage space, warehouse, liquid bulk tank	.508	X7.3	Supported by local and provincial government planning	.660	X4.15	Sufficient hinterland	.564
X2.8	Overall port capacity	.642	X7.4	Political stability	.530	X4.16	Market power / economic activity of hinterland	.490
X2.9	Standardised technical infrastructure	.619	*X7.13**	*Less bureaucracy*	.386	X4.17	Overlapping hinterland	.585
*X2.10**	*Continuous infrastructure upgrade*	.630	*X7.15**	*Central gov coordination with others*	.614	X4.18	Expansion of foreland	.444
X3.1	Overall port efficiency	.575				*X4.20**	*new local market*	.524
X3.2	Cargo handling efficiency	.588				*X4.21**	*local fertile land*	.660
X3.3	Low cargo damage	.489				*X4.22**	*near tourism sites*	.705
X3.7	IT ability	.591				*X4.23**	*new industrial sites*	.431
X3.8	Stability of port's labour	.655				X5.6	niche market / specialised cargo volume	.596
X3.10	Good management and labour relations	.544				X5.8	high value cargo	.545
X3.11	24/7 service	.529				X5.9	low value cargo	.560
X3.12	Communicative and responsive	.673						
X3.13	Cargo tracking system	.557						
*X3.14**	*Overall quality of human resources*	.610						
X4.1	General road connecting the surrounding cities	.395						
X4.6	Available land for port and logistics expansion	.501						
X5.3	Container cargo volume	.494						
*X5.10**	*Mapping of cargo*	.308						

Source: Author, *)Variable added from interview results, the different colours shows their grouping before EFA

First, a surrogate variable is the item variable mostly representing the factor. It is used when researchers need simplicity, or if they have a certain item variable very much representing the factor. Second, factor scores are the value of items by its factor loading. It is used when researchers stress on orthogonality of the masures. Lastly, summated scales are composite value for a set of variables calculated by taking the average of the variables in the scale or in the same factor (Hair et al. 2010, p.142). It has an assumption that the weights for each variable are equal in the averaging procedure. It iss used when researchers stress on having replication of their work in other studies (Hair et al. 2010, p.144). Since having survey in this thesis aims to measure variables and achieve generalisation of findings (Section 3.1.5), hence, summated scales are used.

In this section, comparison of median represented by summated scales of the 3 factors are conducted for each stakeholder. Comparisons are not done between stakeholder types since the research question and objective is to understand each stakeholders' perception towards F1, F2 and F3. Hence, comparison is done between F1, F2 and F3 with related conditions (within group) because they were answered by the same respondents. Moreover, comparison of medians is conducted in groups with small size. As seen in Section 3.3.3, response rate of the survey is under 30 responses for each stakeholder, exept from Cargo Owners which has 49 responses. This implies that data from each stakeholder does not have sufficient statistical power.

Therefore, non-parametric statistical tests are used, more specifically the ones for 'related conditions' since each respondent themselves (the same person) gave their perception for F1, F2, F3. Friedman ANOVA tests and Wilcoxon Signed Rank test are the most appropriate tests. They fall under non-parametric tests, which enables loose restriction in statistics, where the data does not have to be normal and in small sample sizes under 20 or under 30 responses (Hair et al. 2010, p.453; Pallant 2016, p.214). Friedman ANOVA is a test for ranked data to investigate differences between three or more conditions, when the scores across conditions are related because the same participant have provided scores in all conditions (Field 2018, p.321). Wilcoxon Signed Rank is a test for ranked data to investigate the same thing as Friedman ANOVA, however, it is to compare between two conditions only (Field 2018, p.297). Both of these tests is in contrast with Mann-Whitney U Test, which is a non-parametric test to compare means of two unrelated groups (Field 2018, pp.285-290).

Results from Friedman ANOVA and Wilcoxon Signed Rank test are summarised in Table 5.22. Detailed mean and median values of each factors for each stakeholder is shown in Appendix 6.

Table 5.22 Results of Non-Parametric Tests

Stakeholder Type	N	Median			Friedman ANOVA (F statistic / sig)	Wilcoxon Signed Rank Test (Standardised Z Test statistic / sig)			Conclusions
		F1	F2	F3	Compare between F1, F2, F3	Compare F1 and F2	Compare F2 and F3	Compare F1 and F3	
All Respondents	171	6.37	5.86	4.86	Reject null hypothesis (238.79 / sig .000)	F1 > F2 (-7.94 / sig .000)	F2 > F3 (-10.54 / sig .000)	F1 > F3 (-11.19 / sig .000)	Distribution of F1, F2 and F3 are different. F1 > F2 > F3
Port Operator (PO)	29	6.13	5.73	4.77	Reject null hypothesis (43.93 / sig .000)	F1 > F2 (-2.93 / sig .003)	F2 > F3 (-4.70 / sig .000)	F1 > F3 (-4.63 / sig .000)	Distribution of F1, F2 and F3 are different. F1 > F2 > F3
Shipping Lines (SL)	26	6.62	6.30	4.88	Reject null hypothesis (41.61 / sig .000)	F1 > F2 (-3.72 / sig .000)	F2 > F3 (-4.40 / sig .000)	F1 > F3 (-4.45 / sig .000)	Distribution of F1, F2 and F3 are different. F1 > F2 > F3
Cargo Owner (CO)	49	6.44	5.73	5.00	Reject null hypothesis (73.33 / sig .000)	F1 > F2 (-4.93 / sig .000)	F2 > F3 (-5.82 / sig .000)	F1 > F3 (-6.03 / sig .000)	Distribution of F1, F2 and F3 are different. F1 > F2 > F3
Logistics Co (LC)	26	6.06	5.66	4.63	Reject null hypothesis (29.84 / sig .000)	F1 > F2 (-2.97 / sig .003)	F2 > F3 (-3.94 / sig .000)	F1 > F3 (-4.31 / sig .000)	Distribution of F1, F2 and F3 are different. F1 > F2 > F3
Central Gov (CG)	14	6.41	6.20	5.18	Reject null hypothesis (15.84 / sig .000)	F1 > F2 (-2.06 / sig .0039)	F2 > F3 (-2.69 / sig .007)	F1 > F3 (-3.11 / sig .002)	Distribution of F1, F2 and F3 are different. F1 > F2 > F3
Local Gov (LG)	3	6.37	5.66	4.81	Retain null hypothesis (4.66 / sig .097)	F1 = F2 (-1.06 / sig .285)	F2 = F3 (-1.60 / sig .109)	F1 = F3 (-1.60 / sig .109)	Distribution of F1, F2 and F3 are the same. Mean differences between F1 & F2, F2 & F3, F1 & F3 equals 0.
Funding Inst. (FI)	5	6.24	6.13	5.09	Retain null hypothesis (4.80 / sig .091)	F1 = F2 (-.40 / sig .686)	F2 = F3 (-1.75 / sig .080)	F1 > F3 (-2.02 / sig .043)	Distribution of F1, F2 and F3 are the same. Mean differences between F1 & F2, F2 & F3 equals 0. However, F1 > F3.
Others (O)	19	6.37	5.06	4.95	Reject null hypothesis (26.587 / sig .000)	F1 = F2 (-1.63 / sig .102)	F2 > F3 (-3.26 / sig .001)	F1 > F3 (-3.82 / sig .000)	Distribution of F1 and F2 are the same. Mean differences between F1 & F2 equals 0. However, F1 and F2 > F3.

Source: Author

Friedman ANOVA indicated that all respondents differ significantly in their perception towards F1 (median= 6.37), F2 (median= 5.86) and F3 (median = 4.86) with F statistics score of 238.79, p = .000. This means their priority for the 3 factors respectively is F1 – F2 – F3. It is supported by Wilcoxon Signe Rank test which indicated that all respondents differ significantly in thir perception between F1 and F2 (Z statistics score = -7.94, p = .000), between F2 and F3 (Z statistics score = -10.54, p = .000), and between F1 and F3 (Z statistics score = -11.19, p = .000).

The same pattern of having F1, F2 and F3 significantly different is seen in other stakeholders such as port operators (PO), shipping lines (SL), cargo owners (CO), logistics companies (LC), central government (CG) and others (O). For local government (LG) and funding institutions (FI) which has under 10 responses, results shows to retain null hypothesis which means F1-F2-F3 are statistically not significantly different. Friedman ANOVA indicated that local government and funding institution respondents do not differ significantly in their perception towards F1, F2 and F3 with F statistics score of around 4, p = .09. This means their priority for the 3 factors respectively is F1 – F2 – F3. It is supported by Wilcoxon Signe Rank test which indicated that local government and funding institution respondents do not differ significantly in their perception between F1 and F2, between F2 and F3 and between F1 and F3 ($p>0.05$). There is something odd in the difference between F1 and F3 in the Wilcoxon test for funding institutions because the p value is under 0.05. However, the Friedman ANOVA has indicated that between F1-F2-F3 has no significant difference, hence, this particular evidence can be neglected. For stakeholder Others, F1and F2 do not differ significantly in their perception ($p>0.05$), with both F1 and F2 significantly higher than F3 (sig $p<0.05$).

The very low sample from local government and funding institutions might bring effect on the tests being insignificant, as shown in the work of Button et al. (2013) in the field of neuroscience. Studies in neuroscience as a whole, show that the average statistical power is approximately no more than between 8% -31%, and this implies that the likelihood of any nominally significant finding actually reflects a true effect is small (Button et al. 2013). More interpretation on comparing means of F1, F2 and F3 for each stakeholder is continued in the next discussion section. Overall findings from Section 5.2 are summarised in the following Box Findings 5B.

Findings 5B:
EFA has grouped the 7 categories of variables and 111 item variables into 3 Factors and 66 item variables. The 3 factors are prioritised differently for all stakeholders, which is F1, F2 and F3 respectively, except for local government and funding institutions.

5.3 Discussion

There are 5 main points to be discussed related to factors for a peripheral port to become a hub, as a result of comparing findings from main interviews with relevant literature. The following Table 5.23 compiles a summary of findings from qualitative and quantitative phase (from boxes 5A to 5B), relevant literature and discussion points. Items in the 'Findings' and 'Relevant Literature' columns are the basic premises to build arguments in 'Discussions' column.

Table 5.23 Findings, Relevant Literature and Discussions in Chapter 5

Findings	Relevant Literature	Discussions
Findings 5A From Main Interviews are 7 categories of variables: X1 – Port Convenience X2 – Port Tangible Aspects X3 – Port Intangible Aspects X4 – Port Cluster and Environment X5 – Cargo X6 – Private Sector Involvement X7 – Government Investment and Policy	1.5 Research context on Indonesia; 2.1.1 Definitions of peripherality and peripheral port; 2.1.2 Advantages and disadvantages of peripherality; 2.1.3 Development of peripheral ports; 2.1.4 Transport development models and port hierarchy; 2.1.5 Peripheral port challenge; 2.1.6 Rise of secondary hub ports and direct call of shipping lines; 2.2.3 Transhipment operations; 2.2.4 Maritime network 2.3.1 Stakeholders in Maritime Economics; 2.4.3 Selection of most related studies and variables: • Concentration Factors • Deconcentration Factors • Port Performance and Competitiveness Factors • Hub Location Factors • Port Selection Factors	6.3.1 The three critical factors: Factor-1, Factor-2, Factor-3 and deleted item variables 6.3.2 Critical Factors and Item Variables for Each Stakeholder.
Findings 5B From Survey are a. Descriptive statistics; b. EFA 3-Factors: • F1: Standardised port operations; • F2: Clear policy, financed and governance; • F3: Positive spatial aspects c. Non-Parametric Tests: comparing means for each stakeholder type		

Source: Author

5.3.1 The Three Underlying Factors

Factor-1: Standardised port operations

It is understood that previous literature suggested ports to have convenience (X1), competitive infrastructure or facilities (X2) and competitive performance or efficiency (X3) to be large hub ports. For established hub ports, competing with other hub ports to capture extensive hinterland and foreland is gained by making their ports attractive and selected by main shipping lines. The port needs to be convenient, such as having shorter distance with main shipping route. They should have the best service in terms of physical and 'soft' infrastructure.

Findings from survey and statistical analysis shows that these three latent variables from the literature are equivalently critical for ports in peripheral locations to become a hub. They have close correlation, hence, making them in one factor. Item variables with factor loadings above 0.60 which explains Factor-1 are: cranes (X2.3), container stacking yard (X2.4), availability of other handling equipment (X2.6), overall port capacity (X2.8), standardised technical infrastructure (X2.9), stability of port's labour (X3.8), communicative and responsive (X3.12). It means that these items highly represent a standardised port operations, with port tangible and intangible aspects as a factor. A possible explanation for this result may be that the three latent variables in Factor-1 are equally important for a peripheral port to become a hub port.

In addition, item variables with factor loadings above 0.60 identified from interview results are continuous infrastructure upgrade (X2.10) and overall quality of human resources (X3.14). These items also highly represent factor-1 and they contribute to the existing literature. Continuous infrastructure upgrade and a standard quality of human resources might be specific in the context of peripheral ports, peripheral locations or in Indonesia's context. In Indonesia's context, mostly port infrastructure is historically inherited from colonialization. When the government upgrades port infrastructure, large ports are usually more prioritised. Hence, respondents might perceive that peripheral ports also needs to be upgraded continuously, which is unique compared to existing literature. Human resource quality is also a concern for respondents because inequality of economy in peripheral locations also effects in lower quality of human resource (see Section 3.3.1).

Factor-2: Clear policy, financed and governance

It is understood that previous literature suggested ports to have support from private sector involvement (X6) and government investment and policies (X7) to be large hub ports (Section 2.4.3). For established hub ports, especially ports in Asia, institutional factors play a huge role in creating hub ports (Section 2.1.5). Institutional factors could be strategic actions of international port operators, main shipping lines, or even the government of where the port is located itself which has their own interest, wanting cargo to be handled dominantly in which part of their country.

Findings fom survey and statistical analysis shows that these two latent variables from the literature are equivalently critical for ports in peripheral locations to become a hub. They have close correlation, hence, making them in one factor. Item variables with factor loadings above 0.60 which explains Factor-2 are: sound investment system (X6.2), shipping alliance formation

(X6.10), and supported by local and provincial government planning (X7.3). This means that these items highly represent public and private sector investment and policy as a factor, for the peripheral port to upgrade its position into a regional hub port.

Item variables with factor loadings above 0.60 identified from interview results are collaboration with shipping line (X6.14) and central government coordination with others (X7.15). These items also highly represent factor-2 and they contribute to the existing literature. Port operators having collaboration with shipping lines are known in the literature (see institutional factors in Section 2.1.5). However, it is unique having local and central government collaborating with shipping lines. This might be the case in Port of Tanjung Pelepas in Malaysia as an example, but not yet established in literature. Since the Indonesian government is also making efforts to collaborate with domestic and international shipping lines, and its factor loading is quite high to represent factor-2, hence, this item contributes very well for the literature. In terms of central government as coordinator to create collaboration between all related stakeholders, this means that stakeholders perceive it ias the central government's responsibility. This will be explained further detailed in Chapter 7 on the roles of stakeholders.

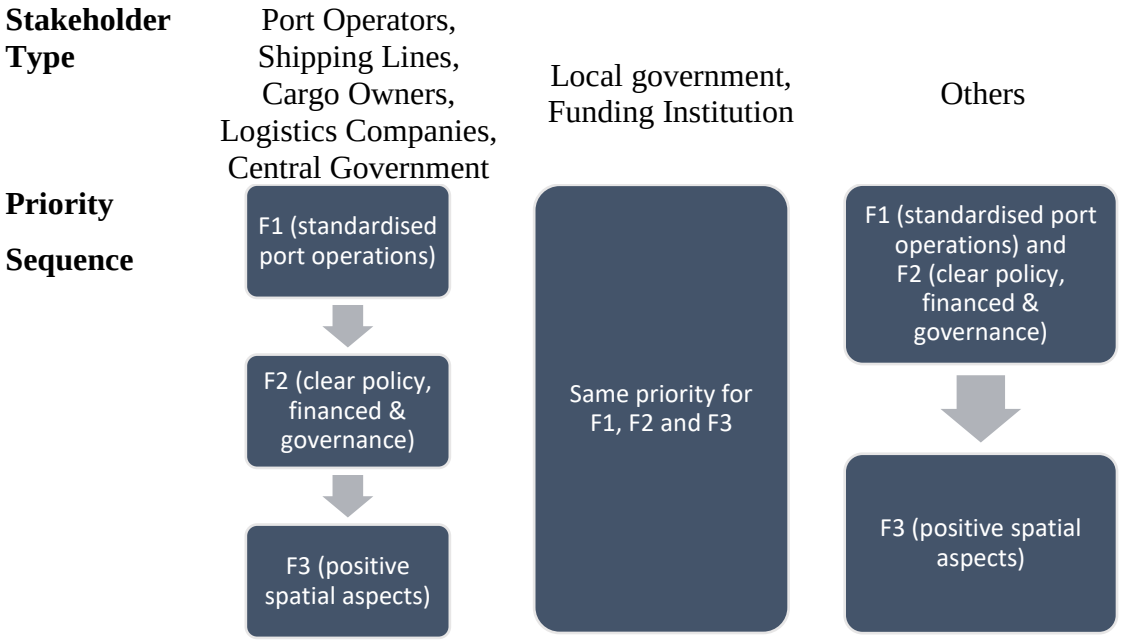
Factor-3: Positive spatial aspects

It is understood that previous literature suggested ports to have support from port convenience (X1), port cluster and environment (X4) and cargo (X5) to be large hub ports. For established hub ports, the port environment or surroundings, inland transport connections, additional value-added services and cargo in general contributes to establish hub ports (Section 3.3.1).

Findings fom survey and statistical analysis shows that these three latent variables from the literature are equivalently critical for ports in peripheral locations to become a hub. They have close correlation, hence, making them in one factor. Item variables with factor loadings above 0.60 and identified from interview results which explains Factor-3 are: local fertile land (X4.21) and near tourism sites (X4.22). There are no items with factor loadings above 0.60 coming originally from literature review. This means that respondents perceive the peripheral port to have fertile land and be near tourism sites because it might attract new plantation as raw material for new industries and become new settlements. These items are perceived needed for the peripheral port to upgrade its position into a regional hub port.

Priority Sequence for Factor-1 (F1), Factor-2 (F2) and Factor 3 (F3)

Findings from comparing the median of F1, F2 and F3 shows that stakeholders' priority for the 3 factors respectively is F1 – F2 – F3, except for local government, funding institutions and other stakeholders (see Table 5.22, Section 5.2.5). Stakeholders' prioritisation on F1, F2 and F3 is shown in Figure 5.12.



Source: Author

Figure 5.12 Stakeholders' Prioritisation on F1, F2 and F3

To understand whether Indonesia's maritime transport players has a unique or common perception on priority of the factors, the literature is reviewed again here. Three studies from the abundant literature in Section 2.4.3 are chosen as representative examples and compared with results of the Thesis in Table 5.24. Those are the works of Lirn et al. (2004), Song and Yeo (2004) and Gohomene et al. (2016). These three studies are chosen because each of them represents different contexts, different geographical location and explicitly rank the importance of variables or factors identified from their survey.

In the context of global transhipment ports, Lirn et al. (2004) revealed that decision making by shipping lines are based on carriers' port costs as the most important factor. It is then followed by geographical location, physical infrastructure and port management/administration (Lirn et al. 2004, pp.81-82). In the context of Chinese ports' competitiveness, Song and Yeo (2004) revealed that their respondents first prioritise port location, then followed by port facilities, cargo volume and service level (Song and Yeo 2004, p.43). Meanwhile the latest study by Gohomene et al. (2016) in the context of Western African ports' attractiveness, shipping lines first prioritise

port infrastructure and draught, then followed by political stability, market size/ cargo volume and international networks (Gohomene et al. 2016, p.422). These studies have noted the importance of port infrastructure, port service and geographical location.

Table 5.24 Comparison of Previous Studies with Results in this Thesis on Critical Factors

	Selected Literature			Results of this Thesis
	Lirn et al. (2004)	**Song and Yeo (2004)**	**Gohomene et al. (2016)**	
Research Context	Selection of global transhipment ports	Selection of Chinese ports by competitiveness	Selection of transhipment ports in West Africa by attractiveness	Identify factors for a peripheral port to become secondary hub port
Respondents	PO, SL	PO, SL, CO, LC, Academician, Shipowners	SL	PO, SL, CO, LC, CG, LG, FI, Others
Rank of Importance:				
1	Carriers' port cost	Port location	Port infrastructure & draught	Standard Hub Port Tangible and Intangible Aspects
2	Geographical location	Port facilities	Political stability	Public-Private Sector Investment and Policy
3	Physical and technical infrastructures	Cargo volume	Market size / Cargo volume	Hub Port Value-Added Aspects
4	Port management and administration	Service level	International networks	-

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

In this thesis, Factor-1 with item variables summarising port operations and infrastructure (e.g. tangible aspects), service or performance (e.g. intangible aspects) and convenience (e.g. location) all together is also perceived more important. Percentage of variance explained in the EFA results shows that 13.9% explains Factor-1, while the remaining are 12.6% for Factor-2 and 9.7% for Factor-3 (see Appendix 6). The median value of Factor-1 is also above the other factors (see Table 5.22). This implies that result of this thesis is aligned with the port selection literature. Furthermore, this thesis brings insights that public-private sector investment and policy (Factor-2) and hub port value-added services (Factor-3) are needed to complement the strategy for a peripheral port to be able to compete further in a higher level of the port hierarchy. This finding has important implications for developing peripheral ports in developing countries around the world.

Deleted Item Variables after EFA

There are 45 item variables deleted after EFA. These items are compiled in Table 5.25. As explained in Section 5.2.4, item variables with low factor loadings (loadings under 0.30) and cross-loadings are deleted to uphold discriminant validity (Hair et al. 2010, p.710).

Table 5.25 Deleted Item Variables After EFA

Var	Code	Item Variable	Reason
X1	X1.1	Shortest inland distance from the sea	A
	X1.2	Less competition for port	A
	X1.5	Various cargo handling services, multipurpose	B
	X1.9	Short sea distance to main routes	B
	X1.10	Short sea distance to feeder ports	B
X2	X2.1	Depth of port channel and basin	B
X3	X3.4	Incentives and promotions	B
	X3.5	Logistics services (warehousing, freight forwarding, LCL handling)	B
	X3.6	Transhipment service	B
	X3.9	Standard quality of port management	B
	*X3.15**	*Financially profitable*	A
	*X3.16**	*Developing/initiating containerisation facilities*	B
X4	X4.2	Highways connecting the port	B
	X4.3	Railways connecting the port	B
	X4.5	Intermodal transport links	B
	X4.12	Load centres	B
	X4.13	General access to load centres	B
	*X4.19**	*Existing basic infrastructure (electricity, water, road, etc.)*	B
X5	X5.1	Overall cargo volume	B
	X5.2	Transhipment cargo volume	B
	X5.4	Local cargo volume	B
	X5.5	Increasing need for container transhipment	B
	X5.7	Economies of scale from increased cargo throughput	B
	*X5.11**	*Availability of natural resource cargo*	*B*
	*X5.12**	*Availability of raw material cargo for industry/manufacturing*	*B*
	*X5.13**	*Export cargo on continuous basis*	*B*
X6	X6.5	Concentration of investment	B
	X6.7	Strong relations between port/port authority and shipping	B
	X6.8	Private sector involvement in port ownership/port devolution	B
	X6.9	Shipping involvement in terminal	B
	*X6.11**	*Not over invest*	B
	*X6.12**	*Local enterpreneurship*	B
	*X6.13**	*Collaboration with local industries*	*B*
	*X6.17**	*Incentives for first local partners*	*B*
	*X6.19**	*Private sector involvement in National Planning*	*B*
X7	X7.2	Supported by national planning for port and logistics	B
	X7.5	Supported by customs regulation	B
	X7.6	Supported by export import and international trade policy	B
	X7.7	Tax cut/ exemption	A
	X7.8	Efficient local and provincial gov administration	B
	*X7.9**	*Active interface between port authority (regulator) and port operator*	*B*
	*X7.10**	*Local and provincial government initiative*	*B*
	*X7.11**	*Aligned with cabotage law / protectionsim*	*B*
	*X7.12**	*Specific policy (e.g. fishing moratorium)*	*B*
	*X7.14**	*Central government initiatives (e.g. subsidy)*	*B*

Source: Author, *)Variable added from interview results; A: caused by factor loading <0.3; B: caused by cross-loadings

First, in terms of low factor loadings, there are 4 items deleted and symbolised as 'A' in Table 5.25. These items are: Shortest inland distance from the sea (X1.1), Less competition for port (X1.2), Financially profitable (X3.15*), Tax cut/ exemption (X7.7). This means that these items do not have enough common variance to explain the factor. It is difficult to explain this result, but it might be related to respondents' perception that these items are less important for the peripheral port to become a hub. Inland distance from the sea might not be an issue in Indonesia as there are quite a lot of ports which are inland or river ports and still very much used until today. Port competition might not be an issue since Indonesian ports are dominantly owned by the government. Financial profitability might not be an issue as well since the small feeder ports in Indonesia are supported by the government through the Ministry of Transport. Finaly, tax cut or exemption is not an important item, might be because the cut is not large enough to make investments in peripheral locations more attractive.

Second, in terms of cross-loadings. The rest of the 41 item variables are deleted because of cross-loadings and symbolised as 'B' in Table 6.27. It means that these item variables are unclear in which factor they represent. They could be to general to represent only one particular factor, unclear in the wordings for respondents, or that they could be perceived in more than one factor by respondents. For example, the item incentives and promotions (X3.4) could be unclear for respondents in what form of incentives or that it could be perceived in both F2 and F3.

Moreover, item variables X1.8 (port safety and security) and X2.3 (cranes for loading-unloading) which were identified as non-normal (see Table 3.30, Section 3.3.4), are not deleted after EFA because they have no issue on factor loadings and cross-loadings. They are both under Factor-1 with sufficient factor loading (above 0.5). Hence, the information brought by these items are retained.

5.3.2 Critical Factors and Item Variables for Each Stakeholder

Critical Factors: Identification of Indonesia's Key Players and Minor Players

Results of EFA brings insights that a further partition could be made among the 8 types of stakeholders used in this study to upgrade a peripheral port into a hub, based on their perception of importance towards F1-F2-F3. The partition is made into two new groups of stakeholders which are 'Key players' and 'Minor players'. Stakeholers in the Key Players group has a different perception on the importance of F1-F2-F3. Stakeholders in this group includes port operators, shipping lines, cargo owners, logistics companies, and central government. They are also respondents which participated in the survey with a higher response (more than 10 people

per stakeholder type). It indicates that stakeholders in this group are assured of their perception or they have more interest to improve F1, F2 and F3, in a prioritised manner respectively.

Meanwhile, stakeholers in the Minor Players group has no difference in their perception on the importance of F1-F2-F3. Stakeholders in this group includes local government, funding institutions and others (academicians, lawyers, indirect stakeholders). They are also respondents which participated in the survey with a lower response (less than 10 people per stakeholder type). It indicates that stakeholders in this group view F1-F2-F3 in an equal manner, without differentiating a certain factor having more weight of importance.

This thesis has enriched the literature by having perception from more stakeholder types compared to those in the existing maritime transport studies (compiled in Section 2.4.2). It has demonstrated that having a peripheral port upgraded into a hub requires collaboration from more types of stakeholders, eventhough, some of them prioritised a certain factor more than other factors (key players) and some of them view all factors having the same importance (minor players). The minor players identified could also indicate that these stakeholders might have less power than the key players in terms of making contribution to the development of peripheral ports.

Most Critical Item Variables

The total 111 item variables from literature and interview results has been reduced into 66 items and simplified as 3 factors. Furthermore, to simplify our understanding on items are more prioritised, 3 items with the highest priority and mean value by each stakeholder are summarised in Table 5.26. Detailed critical item variables from each stakeholder varies, either identified by qualitative approach (by interview codings) or by quantitative approach (by identifying items with the highest mean value). It is difficult to make alignment between results of the qualitative and quantitative approach. Furthermore, there are a couple of critical items that are deleted because of EFA. However, it could still be useful to understand which is more prioritised by each stakeholder. Imlplication of these findings are beneficial to uphold collaboration among stakeholders or policy formulation, since it shows what each stakeholder are more interested in.

Table 5.26 Prioritised Factors and Item Variables for Each Stakeholder

Stakeholder Type	Qualitative Findings (Section 6.1)	Quantitative Findings (Section 6.2)	
		Prioritised Factors	**Item Variables with Highest Mean**
All stakeholders	X1.10 short sea distance to feeder ports *X3.16* developing containerisation facilities* *X7.14* central government initiatives*	F1 > F2 > F3	X1.8 safety and security X2.3 cranes X3.12 communicative and responses
Port Operator (PO)	*X3.16* developing containerisation facilities* X1.10 short sea distance to feeder ports X2.1 depth of port channel and basin	F1 > F2 > F3	X2.3 cranes X7.6 supported by export import and international trade policy X3.7 IT ability
Shipping Lines (SL)	*X4.19* new local market* *X6.16* involve in CSR programmes* *X7.11* aligned with cabotage law/protectionism*	F1 > F2 > F3	X1.8 safety and security X2.3 cranes X2.10 continuous infrastructure upgrade
Cargo Owner (CO)	X2.3 cranes X4.2 highways connecting the port *X7.13* less bureaucracy*	F1 > F2 > F3	X1.8 safety and security X3.12 communicative and responsive X2.3 cranes
Logistics Co (LC)	*X7.11* aligned with cabotage law/protectionism* *X5.12* availability of raw material cargo for industry/manufacturing* X4.1 general road connecting the surrounding cities	F1 > F2 > F3	X1.8 safety and security X2.3 cranes X3.13cargo tracking system
Central Gov (CG)	*X4.23* new industrial sites* *X7.14* central government initiatives* X5.1 overall cargo volume	F1 > F2 > F3	X2.8 overall port capacity X7.3 supported by local and provincial government planning X7.2 supported by national planning for port and logistics
Local Gov (LG)	*X7.13* less bureaucracy* *X7.14* central government initiatives* *X7.12* specific policy (e.g fishing moratorium)*	F1 = F2 = F3	X3.10 good management and labour relations X1.1 shortest inland distance from the sea X1.3 available sea routes
Funding Inst. (FI)	X5.4 local cargo volume X7.2 supported by national planning for port and logistics *X7.13* less bureaucracy*	F1 = F2 = F3	X1.3 available sea routes X1.8 safety and security X2.2 quay or berth length
Others (O)	-	F1, F2 > F3	X1.8 safety and security X3.12 communicative and responsive X3.9 standard quality of port management

Source: Author, *)Variable added from interview results

Inline with Results of the Ranking-of-the-7-Latent-Variables

In Section 6.2.1, its identified that port convenience (X1), port tangible aspects (X2) and port intangible aspects (X3) are perceived by most of the respondents as Rank-1, 2 and 3 in the Ranking part of the survey. Since these three latent variables are grouped into Factor-1, this shows that there is consistency between respondents' answers in the Ranking-of-7-latent-variables section and in the Likert scale section for EFA of the survey. Furthermore, statistical requirements in the EFA results has been tested for its reliability and validity, hence, the three critical factors identified from EFA can be accepted.

5.4 Conclusion

A mixed approach is adopted, qualitative by interviews and quantitative by survey, to identify the critical factors in the development of a peripheral port into a hub in Indonesia's maritime transport sector (research question-2) and critical factos for each stakeholder (research question-3). In this chapter, findings from main interviews are put together with variables identified from literature. It is further tested by survey and quantitatively analysed using Exploratory Factor Analysis and Non-Parametric Tests. It is also discussed to confirm which are aligned with literature in Chapter 2, and which are unique contributions of the Thesis. Overall, the finding and discussions confirms the literature without any major confrontations or clashes. However, it complements the literature on three important points as follows.

First, is the identification of three critical factors needed for a peripheral port to become a hub, which are: Standardised port operations (Factor-1); Clear policy, financed and governance (Factor-2); Positive spatial aspects (Factor-3). Second, is the priority sequence of the factors. Factor-1, which represents 29 item variables, is perceived as the Most Important factor. This is then followed by Factor-2 which represents 15 items and Factor-3 which represents 22 items. This sequence of importance applies for stakeholders from the port operators, shipping lines, cargo owners, logistics companies and central government. The remaining stakeholders (local government, funding institutions and others) perceive the three factors as having the same level of priority. Lastly, most critical item variables for each stakeholder are also identified. This is useful to understand which is more prioritised by each stakeholder, hence, useful for collaboration among stakeholders or policy formulation.

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Chapter 6
Stakeholder Willingness to Invest in Peripheral Ports

"Transport innovations benefit advanced economies most, especially those countries and areas that are centrally located in relation to the world's trade flows. Even within advanced economies, urban and inter-city transport networks are far superior to those in the rural periphery" (Knowles 2006, p.416).

This chapter explains findings, discusses and answer the fourth research questions on stakeholder willingness to invest in peripheral ports. It combines input from literature review (Chapter 2), research methodology, and qualitative-quantitative research process (Chapter 3).

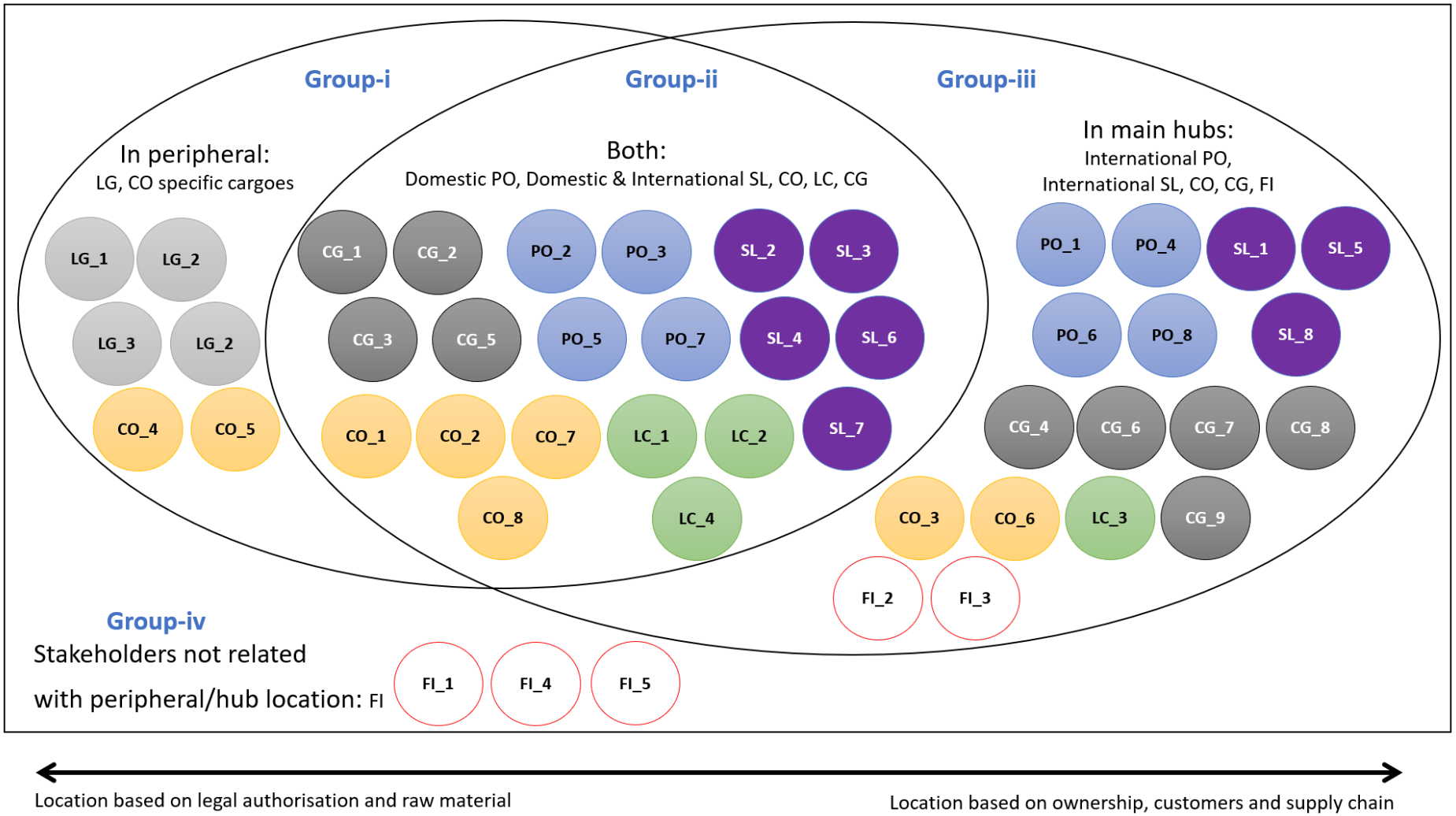
6.1 Findings from Main Interviews

Qualitative findings related to this chapter is divided into four main parts. It consists of identifying their location of business or projects (Section 6.1.1), perception on the importance of peripheral locations and peripheral ports (Section 6.1.2), perception of willingness (Section 6.1.3), perception on stakeholders' roles in peripheral port development (Section 6.1.4).

6.1.1 Location of Respondents' Business or Projects

In order to understand the wider implications of stakeholder willingness, the researcher first investigated stakeholders' business location. This is used to indicate their perception of peripherality and how far they are willing to expand business in peripheral locations. A mapping of the 46 respondents' business location is described in Figure 6.1. Stakeholders' locations are grouped into 4 types, which are: i) in the peripheral, ii) in main hubs, iii) both or in between peripheral and hubs, and iv) not related with the peripheral/hub. A Venn diagram is used to map all the interview respondents and their position in the 4 types of location.

Stakeholders located in the peripheral (group-i), are local government (LG) and cargo owners (CO) with specific cargoes related to plantations. Stakeholders located in main hubs (group-iii), are international port operators (PO), international shipping lines (SL), central government (CG), cargo owners (CO), logistics companies (LC) and financial institutions (FI). The cargo owners in this category are related to construction and automotive manufacturing. Moreover, the funding institutions in this category focuses on assisting government and its regulations.



Source: Author.

PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

Figure 6.1 Stakeholders' Business in Peripheral Locations

Stakeholders located in both or in between peripheral and hubs (group-ii) includes domestic port operators, domestic and international shipping lines, cargo owners, logistics companies and central government. There is only one international shipping line in this category which goes to more peripheral locations because it transports bulk cargo. The cargo owners in this category are related to oil and gas, manufacturing electronic goods and FMCG. Moreover, central government officers in this group are different to the ones only in main hubs because they have office branches or ongoing projects in peripheral locations. Lastly, stakeholders not related with the peripheral/hub location (group-iv) are only from funding institutions.

Figure 6.1 also shows a pattern based on stakeholders' background. Stakeholders located in main hubs in the right extreme are based on business ownership, location of their customers and supply chain. Meanwhile, stakeholders located in peripheral locations in the left extreme are more related to legal authorisation and location of its raw material. The following are explanations for each stakeholder type.

Port Operators and Shipping Lines

For port operators and shipping lines, decision on business location depends on their ownership and customers. International port operators and international shipping lines are concerned on location because their business owner or shareholders expect large profit and return on investment, which can only be achieved in main hub or established port-city. The following statement from a port operator supports as evidence: *"From our point of view in port business, our main focus as foreign investor and operator is to forecast on the hub ports. Therefore, peripheral ports, from business point of view, not mainly, I mean the priority to be very frankly. Maybe because we are not NPO or NGO. So, we have to get the money back from our investment… Our strategy is to concentrate on hubs…the hubs in other countries only the mature. Because the hubs ports have reasons why they become hubs for a history of time. Maturity and concentration of the industry. Closeness to hinterland" (PO_1).*

It is similar for international shipping lines; however, it differs since ships are able to shift the route of their services. One of the international shipping line respondent serves more peripheral location because they have customers with bulk cargo. Two of the three international shipping lines serving the main hubs (in group-iii) has tried to enter Bitung, which is considered more peripheral. However, the service was not continued due to the lack of cargo volume (explained in Section 4.1.1). Unlike international port operators which has fixed assets, international

shipping lines has more flexibility when investing and expanding business to more peripheral locations.

Domestic port operators and domestic shipping lines who operates in both peripheral and main hubs consider location critical. They are owned by state-owned companies or private-national owners. Specifically, for domestic ports, the main reasons of their location are based on legal authorisation. Domestic port operators and domestic shipping lines rely on customers or market in those locations and expect to expand their business from customers in more peripheral locations. The following statement from a domestic shipping respondent supports as evidence: *"We are not concerned with the distance, but with where the activity is located. If we see that there is no container ship there yet, we will containerise it, and through market survey if there is potential, we will analyse it in depth, then we will open new branches or expand business" (SL_2).*

Cargo Owners

For cargo owners, decision on business location depends on their cargo type and distance with customers, whether to be closer to customers, suppliers or to raw material. Cargo owners closer to customers and suppliers in main hubs are related to construction (CO_3) and automotive manufacturing (CO_6). Respondent CO_3 expressed how they prioritise construction development projects by the government and state-owned companies, which are mostly in established cities, also with the availability of basic infrastructure such as electricity and ports. Respondent CO_6 expressed how they prioritise their automotive manufacturing activities in Jakarta because it is near their domestic consumers, which are mainly in Java Island. Despite that there is a large potential of consumers in other islands, shifting or expanding factories out of Java Island is too difficult since they can not relocate their suppliers which are mostly in the outskirt of Jakarta or in the urban fringe. Basic infrastructure also appears as important factor.

Cargo owners closer to customers in both main hub and peripheral locations are related to oil and gas (CO_1), manufacturing electronic goods (CO_2) and FMCG (CO_7 and CO_8). It is seen that they have a common pattern, in how they prioritise their consumers in peripheral location as much as consumers in main hubs. They use agents or third party as partners to distribute their products to more peripheral locations, so it lessens the responsibility of its headquarter office. The type of cargo they are selling are critical for daily use, hence, they can not favour one consumer over another based on their location. Respondent CO_1 stated that their service to provide fuel for all citizens in the country not only has an impact to the macro-

economy, but also political impact. Respondent CO_2 as another example stated that a rural area which has been installed 35,000 Mega Watt of electricity will inevitably lead to more consumers wanting to buy air conditioners, washing machines and refrigerators. For FMCG cargoes, CO_7 (beverage products) and CO_8 (food, beverage, personal care and cleaning products) similarly expressed their concern on ship frequency. Product distribution to Eastern Indonesia relies on Surabaya because Makassar does not have a frequent ship call. This is critical for them because irregularity in transport services could lead to the risk in lost of sales.

Cargo owners closer to their raw material in peripheral locations are related to palm oil plantations (CO_4) and fruit plantations (CO_5). Their decision on location relies on land availability and types of soil. However, challenges that they are facing is concerned on road transport links to the nearest port and the need of better quality of human resources in peripheral locations.

Logistics Companies

For logistic companies, decision on business location also depends on their customers. They identify themselves in which location they aim for in their business. For example, in peripheral locations, respondent LC_1 are more interested with large projects from the government such as to distribute medical equipment or transmitter for telecommunications. LC_2 and LC_3 also stressed the important role of the government in regulating transport and logistics which affects their customers. They argue that there are inadequate logistics experts in the government with political power, government inconsistency and complicated bureaucracy which makes it difficult for local entrepreneurs to conduct business. Surprisingly, LC_4 identified their customers' behaviour and saw that there is a subtle shift from FMCG factories based in Jakarta to Makassar. Respondent LC_4 explained that Makassar is chosen because of cheaper labor, cheaper land, and good quality of water, compared to the outskirt of Jakarta.

Central Government and Local Government

For central government and local government, decision on location is inevitably based on their duty, assignment or legal authorisation. Central government respondents in main hubs (group-iii) has stronger regulatory role which affects the nation. Similarities between them is also seen that prioritised development projects are still dominated by projects in large cities, more on land transport compared to maritime transport, and projects with more direct economic effect.

On the other hand, the rest of the central government respondents (in group-ii) which has office branches or handle ongoing projects in peripheral locations, correspondingly supports that

peripheral locations to have 'privilege' or more 'affirmative action'. Local government in Indonesia has local autonomy, however, they still have less power compared to the central government. Peripheral port development very much depends on approval from related ministries in Jakarta office.

Financial Institutions

For financial institutions, decision on location is based on their customers as well. However, they could be devided into two, one located in main hubs (group-iii) and the other unrelated to peripheral/hub status (group-iv). Respondents in group-iii explained that their work is more related to assisting the central government on making regulations. They stress that decision on business location depends on the human capacity of their customer such as the government ministries. As example, FI_2 emphasises on the 'implementability' of the project meaning that there is quality for the lending operation, the human capacity to run the development project, demand for assistance and impact for poverty alleviation. Eventhough it is not commercially feasible, they are more concerned on how to run it, who operates it, and who owns it.

Moreover, financial institution respondents unrelated to peripheral/hub location is defined as group-iv because they do not see location as a consideration in their decision making or they have indirect customers in peripheral locations. They depend on the feasibility and profitability of the projects owned by their clients. Either their clients are in the private nor public sector. They do not invest as a real asset in peripheral locations. Peripheral locations are seen as potential and not seen as a barrier to do business.

As example, one of the respondent in this group stated, *"Actually, were not focusing on certain industries, we are open to many industries as long as we have the capability to scale out the business from the credit point of view, market point of view, if we have the expertise on the business, then we will try to assist and come up with solutions with the sponsors… I think the remote area have the potential of a local mining sources, maybe farmers, maybe can be build dam for irrigation, or maybe a toll road to connect one area to another, maybe theres an oil inside the land of it… We usually assist from the financing point of view, not from the technical assistance… Business in more rural area are not necessary our clients but may be the customers of our clients" (FI_4).*

Overall, findings on the respondents' business/project location are presented in the following Findings Box 6A. It can be concluded that stakeholders located in (or closer to) the main hubs are based on their business ownership, location of their customers and supply chain/suppliers.

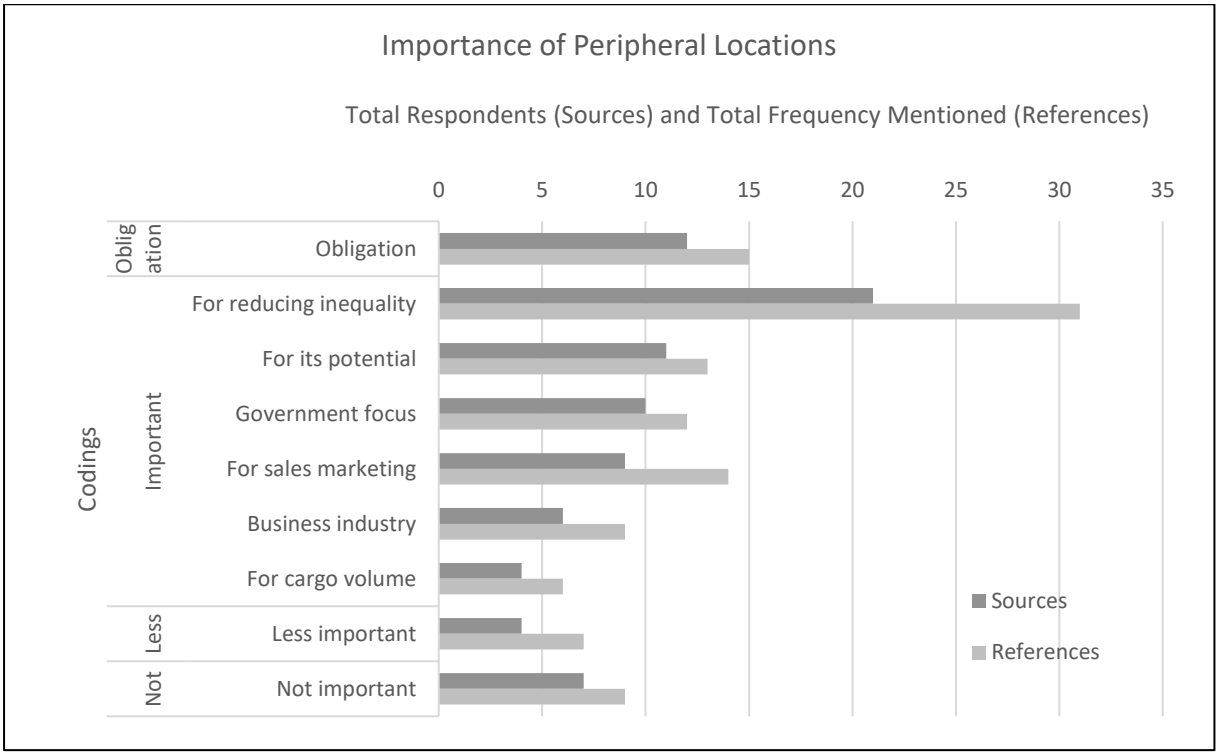
Stakeholders located in more peripheral locations are related to legal authorisation and location of its raw material. Meanwhile, stakeholders who does not consider whether they are located near the hub/peripheral (e.g. from Financial Institutions) are because they focus on feasibility and profitability of the projects owned by their clients.

Findings Box 6A:
Stakeholders located in (or closer to) the main hubs are based on their business ownership, location of their customers and supply chain/suppliers. Stakeholders located in more peripheral locations are related to legal authorisation and location of its raw material. Stakeholders without considering their locations are focused on feasibility and profitability of their client's projects.

6.1.2 Importance of Peripheral Locations and Peripheral Ports

Reasons of Importance

The interviews also tried to gain an understanding of stakeholders' perceptions on the importance of peripheral locations. This also helps to indicate how far they are willing to expand business in peripheral locations, since more importance could indicate more willingness. Overall, respondents' responses are classified into four categories: 'important as their obligation' (to look after and manage), 'important', 'less important', and 'not important'. The classification uses magnitude coding, which means using phrases to indicate intensity, as explained in Section 3.2.2 Table 3.13. Figure 6.2 describes the codings for importance of peripheral locations and its frequency.



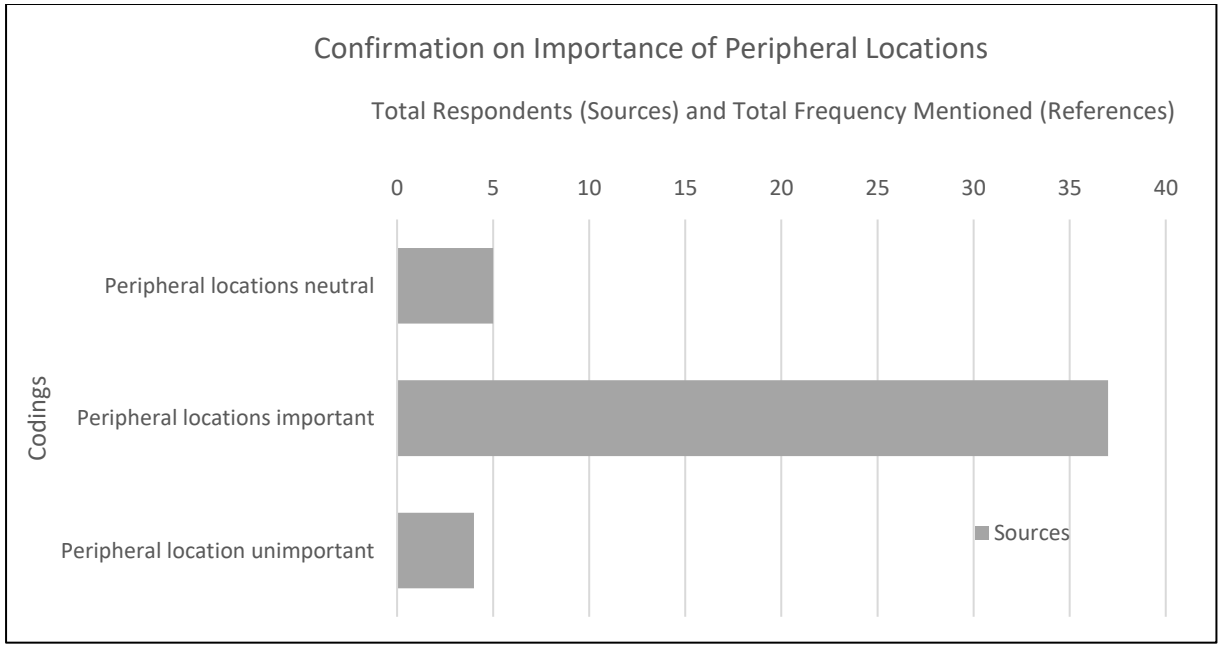
Source: Author

Figure 6.2 Frequency Data on Importance of Peripheral Locations

Responses indicating peripheral locations as important are further identified into 6 main reasons, which are: important for sales and marketing, for reducing inequality, for its potential, for business/industry, for its cargo volume and important government focus. Most respondents (21 sources) perceive peripheral locations important for reducing inequality. This implies that almost half of the total respondents consider peripherality as a social issue, that they sympathise for citizens living in peripheral locations having commodities more expensive than in urban centres.

For example, from a shipping line's point of view saying "w*hether it is important or not, I have to say it is important because Indonesia is an archipelago country, so it's very important, to have a network" (SL_6);* a cargo owner's point of view saying *"so far it is important because peripheral locations has economy that is stagnant, left behind than other places"(CO_4);* and a central government's point of view *"so they feel they are part of this country eventhough there are many shortcoming" (CG_4).*

This is supported by their responses to confirm importance in the end of each interviews shown in Figure 6.3. The confirmation response was calculated using only one answer for each source, hence, the number of sources is exactly the same as the number of references. There are 37 of 46 sources confirming their overall perception is important. On the other hand, responses indicating peripheral locations as less important and not important are explained further by stakeholder type.



Source: Author

Figure 6.3 Confirmation on Importance of Peripheral Locations

Importance by Stakeholder Type

Breaking down these codes by their stakeholder type shows that most responses by port operator, shipping lines, cargo owner and central government perceive peripheral locations as important. Table 6.1 describes stakeholders' position on the importance of peripheral locations which enables us to see two extremes. Importance as obligation is on the top extreme while unimportance is on the bottom extreme. It is noted that one respondent source could have more than one coding reference, hence, one source could also have more than one perception on importance.

Table 6.1 Importance of Peripherality by Stakeholder Type

Importance of Peripheral Locations	Frequency of References						
	PO	**SL**	**CO**	**LC**	**CG**	**LG**	**FI**
Obligation	3	1	1	1	4	5	0
Important for reducing inequality	5	7	3	0	5	6	4
Important for its potential	2	5	4	0	1	0	1
Important government focus	0	1	0	1	8	1	1
Important for sales marketing	1	1	8	3	0	0	1
Important business industry	0	1	0	4	0	0	3
Important for cargo volume	4	1	0	1	0	0	0
Less important	0	0	0	1	5	0	0
Not important	4	1	3	1	0	0	0

Source: Author. PO: Port Operators, SL: Shipping Lines, CO: Cargo Owners, LC: Logistics Companies, CG: Central Government, LG: Local Government, FI: Funding Institutions.

First perception on obligation, respondents with these responses are reflected on their background. They are either from government institution, company owned by government or because their business is legally authorised to operate in a particular peripheral location. Besides local government and central government who are obliged to manage and monitor peripheral locations, state owned domestic port operators has limited location of service based on their legal authorisation. They are allowed to serve particular locations only, which is then changed after Constitution UU no.17 year 2008 allowing them to build and operate outside their historical zones There is still inertia and bureaucracy for them to expand business outside of their initial zones. For example, quote from one of the port operators as follows *"It could be seen from two points of views. As a state-owned company, we also have the role as agent of development hence we can not ignore those marginal locations" (PO_3).*

Second perception on importance, overall respondents are dominated by their concern on reducing inequality except cargo owners and logistics companies who are more concerned on sales – marketing and business industry. This shows how their perception are reflected on where their consumers/raw materials are or where the 'juicy business' is located. They acknowledge

that Eastern Indonesia has an increasing trend in sales and potential market to explore. As example, a cargo owner states *"Logically we will send to customers who needs our product whereever they are. As long as there are opportunities, we will send them…. If the product is not available in their location, they (agents) will call the centre to ask which the nearest branch is to get it" (CO_2).* Moreover, a logistics company states *"Of course, because this business is considered a niche market, because in niche market they wouldn't bargain the price. If we get in 'repulsion industry' we will be really bleeding because competition is really tough. But in this remote area business is considered really juicy, but the qualification is high. It needs health safety and environtment, qualification, skillfull human resources and network" (LC_1).*

A portion of financial institutions also supported that peripheral locations has importance for business industry in Indonesia in general. Financial institution is more attached to central locations. They confirm that they always look at feasibility or return on every investment they make. However, since they have clients in peripheral locations (e.g. mining, agriculture companies, retail companies), therefore they see it as important. As example a financial institution stated *"We understand if we would like to do something in eastern Indonesia we have to start at the port side. Maybe government is looking at another element. But if we are looking for connectivity we will start at the port. That is clearly signals to start there." (FI_2).*

It is seen that cargo owners, logistics companies and financial institutions are based on the location of their consumers and raw materials. Simplifying the fact that cargo owners varies on their product type, still they have consumers in more peripheral locations and these consumers has the same rights to obtain the products. They could also see a growing consumer population from peripheral locations. Shipping lines and logistics companies are more attached to where the cargo is, hence, they have to provide services to more peripheral locations.

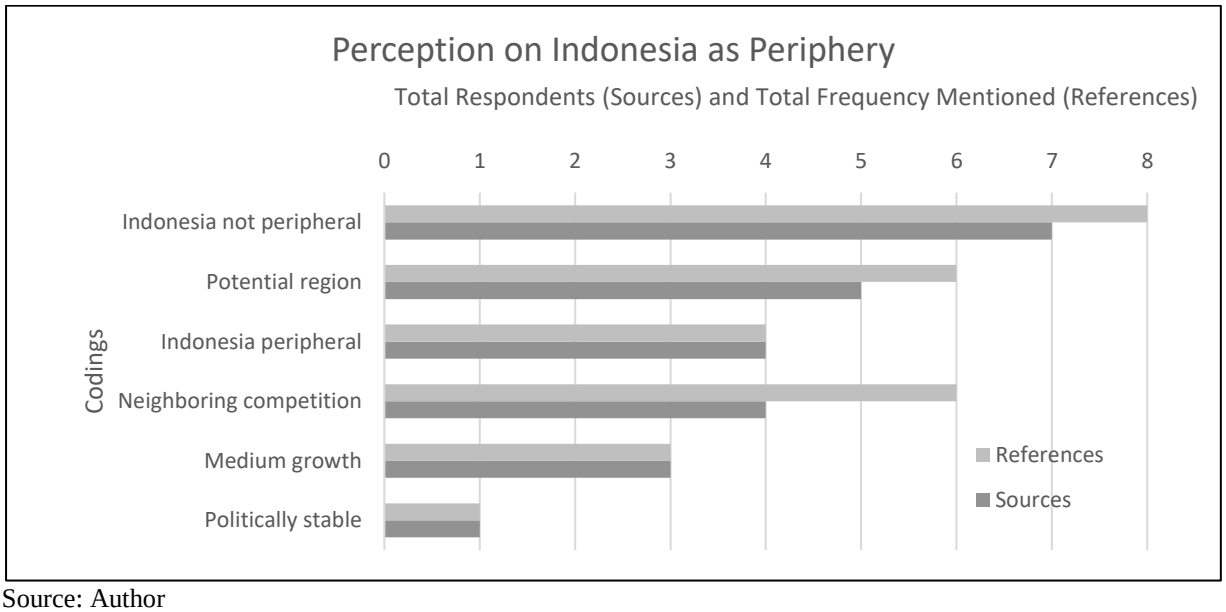
Third perceptions on less importance of peripheral locations in Figure 6.2, surprisingly is dominanted by central government. Central government source who works in bilateral foreign funding expressed that foreign aid or loan donors are not interested to work on port development because it is too costly (CG_5). Central government working on prioritised development projects explained that they prefer more development on land transport infrastructure and larger economic impact (CG_8). One respondent from a logistics company explained that peripheral locations are less important because the government itself is not supporting, he said *"government investment so far only allocates 90% for land infrastructure, the rest 7% for sea infrastructure…*

XX Ministry allocates 5000 Trillion for port development plan, where 40% is from national budget and the rest from private sector investment" (LC_3).

Lastly, responses saying peripheral locations are not important are mostly from port operators and cargo owners. Their reasons are because they represent international port operators who perceive that they have to seek profit with large capital in port business. Unlike shipping lines, they are unable to shift their assests to other locations if they do not achieve return on investment; or shift their service to other strategies (e.g. shipping lines could change their shipping routes easier). Another reason is because the cargo owners does not have customers in peripheral locations. As example stated in this quote, *"What is known for sure the largest population is in Java island, second in Sumatra island, third in Sulawesi island, fourth in Kalimantan island. What we are looking at is Java and Sumatra market… the others are not significant" (CO_2).*

Indonesia in the Periphery?

Opinion on whether Indonesia is considered peripheral in the Asean region is also divided. Most respondents mention Indonesia as a growing market with potential and not in the periphery. Figure 6.4 describes stakeholders' perception on Indonesia as periphery. There are also a proportion of respondents mentioning Indonesia more peripheral compared to its neighboring ASEAN countries, from ports and shipping sector to automotive and consumer goods product. As example a central government participant stated *"Peripheral, still peripheral to Singapore. It has smaller volume in export and import" (CG_8);* and a port operator participant stated *"5 to 8 years ago Indonesia are ahead of India and Vietnam but now they are better. Myanmar is now promising" (PO_8).*



Source: Author

Figure 6.4 Perception on Indonesia as Periphery

However, dominantly respondents perceive Indonesia, represented by Jakarta, as not peripheral and a potential region which includes throughput, resources and population. As example a large international shipping company stated *"No, not for us. If you're looking with whom Indonesia is competing with then it is Bangkok. There is exstensive port expansion in a place called Cai Mep; Phillipines, Manila; Also, Tanjung Pelepas. Those are the important ports. But when you're a big company like us, for us to push going to Bitung was peripheral" (SL_1).* A financial institution participant mentioned Indonesia's potential in this statement *"Its gonna be step by step, its not an overnight transformation. But if you look at the potential it self on the resources of Indonesia, human capability, we are promising nations" (FS_4).*

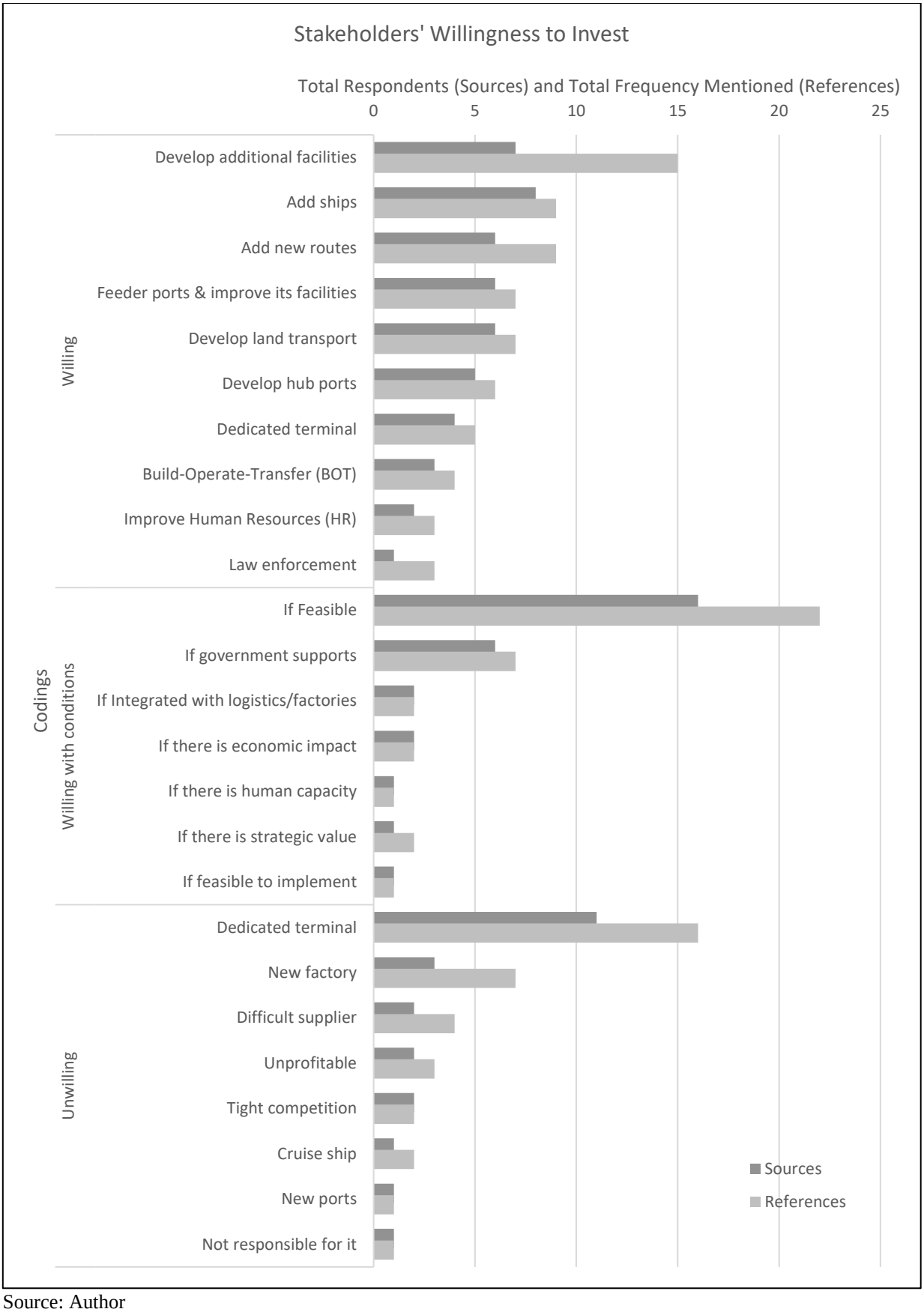
Overall, findings on the importance of peripheral locations are presented in the following Findings Box 6B. It can be concluded that stakholders perception on importance of peripheral locations is dominantly important to reduce inequality. Other reasons for importance and unimportance vary by stakeholder type.

Findings Box 6B:
Peripheral locations are dominantly perceived important to reduce inequality. Other reasons for importance and unimportance vary by stakeholder type.

6.1.3 Willingness to Invest in Peripheral Ports or Peripheral Locations

This section addresses questions on stakeholders' willingness to expand business in peripheral ports or peripheral locations. Responses from their wordings, expression and actions were analysed and classified using magnitude coding as explained in Section 3.2.2 Table 3.13, similar to coding perception on importance. Responses are classified into three categories: 'willing', 'willing with conditions' and 'unwilling'. Figure 6.5 describes the codings for stakeholders' willingness to invest and its frequency.

Responses indicating willingness to invest are dominantly willing to add ships (8 sources) and develop additional facilities (7 sources). These additional facilities include processing unit for products (e.g. fisheries, CPO, oil refinery), special economic zones, cooperative, industrial logistics facilities, warehouses, cold storage system / cold chain, reefer containers, cross-docking facilities, trucking facilities, branch offices. These responses came from the central government, local government, cargo owners and logistics companies. This implies that the government are willing to invest in facilities which could boost cargo volume from peripheral locations. Other responses indicating willingness to invest are as follows:



Source: Author

Figure 6.5 Perception on Willingness to Invest

To add ships and add new routes (from shipping lines); Develop feeder ports, improve its facilities and passenger terminal (from central government, local government and port operator); Develop land transport such as road, tol road and railway (from central government and cargo owners); Develop hub ports (from central government, cargo owners, port operator and shipping lines); Dedicated terminal (from shipping lines and cargo owners); Build-Operate-Transfer (from central government and cargo owners); Improve human resources (from financial institutions); and develop Navy military facilities for law enforcement (central government). It is quite surprising when cargo owners have intention to improve roads and have a dedicated terminal. This relates to the road transport to reach their raw material in peripheral locations (e.g. CO_4) and cargo owners in specific products like fruits (e.g. CO_5).

Responses indicating willingness with conditions are dominantly willing to invest if it is financially feasible (16 sources). These responses came from all respondent type except the local government. This includes answeres related to feasibility studies, return on investment and profitability of the project. Responses indicating willingness with conditions are followed by if supported by the government, if integrated with logistics/factories, if there is economic impact, if there is human capacity who conducts the projects, if there is strategic value and feasibility to implement. Respondents who heavily relies on feasibility are cargo owner, logistics companies domestic port operator and funding institutions because they follow government plans and shipping lines' business expansion. As example, a financial institution respondent stated, *"our decision to provide loan for ports depends on the central government's request" (FI_5);* and a cargo owner respondent stated, *"not yet, because we haven't heard the concrete plan from the government" (CO_6).*

The last responses indicating unwillingness are dominantly not willing to develop a dedicated terminal (11 sources). These responses came from all respondent type except the central government, local government and funding institutions. Cargo owners explained that their cargo volume is not that much to have its own dedicated terminal, or their cargo type does not require a dedicated terminal. As example, a cargo owner stated, *"no, we still use commercial ships because eventhough we deliver a large amount, it does not reach to fill in one ship" (CO_8).* The rest explained that dedicated terminal is not their focus or that they prefer to serve general customers. Responses indicating unwillingness to invest are followed by unwilling to develop new factories, difficultites of geting suppliers, unprofitable, tight competition, unwilling to go in cruise ship business, unwilling to develop new ports and unwilling because they are not responsible for it.

Willingness by Stakeholder Type

Figure 6.6 shows findings on stakeholders' willingness to invest by stakeholder type during the final confirmation question. The confirmation responses were calculated using only one answer for each source, hence, the number of sources is exactly the same as the number of references which is a total of 46 respondents. A new set of magnitude coding, 'already investing', was created which devides willingness further into four categories. This coding was added because were stakeholders which showed they had done real actions or operations in expanding their business/project to more peripheral locations. There were 12 respondents who confirmed they were already investing, 14 confirmed willing, 13 confirmed willing with conditions and 7 confirmed unwilling.

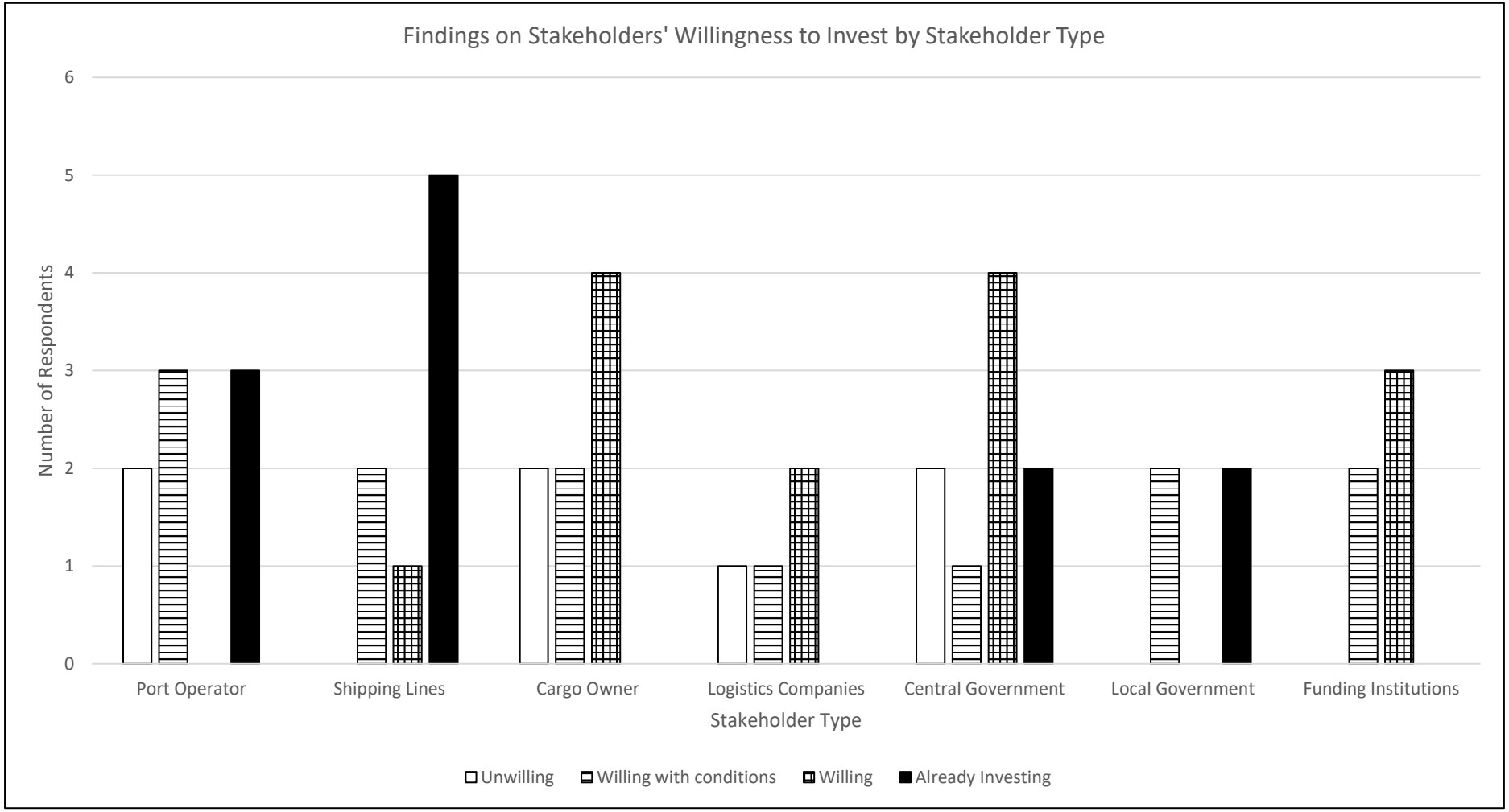
Respondents already investing are shipping lines, domestic port operators, central and local government. Shipping lines perception on willingness ot invest is aligned with their perception on importance of peripheral location (Table 6.1 in Section 6.1.2). They see Eastern Indonesia as important for reducing inequality and having potential cargoes. Shipping lines operating in Indonesia knows what cargo are available in the locations (Figure 4.3 in Section 4.1.1). Shipping lines, both domestic and international, with strong financial condition has CSR programmes to provide services to these small-attractive peripheral locations, confident to face tough competitors and to benefit from the becoming the first mover. They also have the flexibility to change its route if not profitable. Unlike shipping lines, company ownership background for port operators influence their willingness to invest, similar to decision on their current business location in Section 6.1.1. Here domestic port operators who has legal authorities to operate and develop peripheral ports are the ones already investing. Central government respondents already investing are related to national security (Sorong naval hub explained in Section 4.2.4) and maritime affairs. Local government whom already invested stressed how they have and will always expand development to peripheral locations, eventhough they do not have much power and needs approval from the central government.

Respondents willing to invest are shipping lines, cargo owners, logistic companies, central government and funding institutions. Cargo owners willing to invest are dominantly companies which has their business location in both/in between main hub and peripheral locations. Funding institutions willing to invest is also aligned with their perception on importance of peripheral location (Table 6.1 in Section 6.1.2). Peripheral locations are important for reducing iniequality and having important business industry to be developed.

Respondents willing with conditions are common in all stakeholder type, dominantly by port operators and cargo owners who are located in main hubs. Local government with conditional willingness expects government policy support and development in peripheral locations to be adjusted according to current needs. Logistic companies and cargo owners willing with conditions rely on government policy support besides financial feasibility conducting such investments. Funding institutions willing with conditions expect feasibility of the project, sufficient human resource capacity to run the development, government support and consistency. These are their reasons because each of them has distinct goals to achieve.

Lastly, respondents unwilling to invest are international port operators, cargo owners from manufacturing and FMCG, logistic companies and central government who are related to rural development and national planning. Reasons for unwillingness from international port operators are because they believe these locations are not important for their business and will not bring direct profit or benefit. They perceived as risky because building ports anywhere requires the same capital and in fixed location, so they are more interested with locations that are already has a hub reputation. They still seek for central-major cities in Indonesia such as Tanjung Priok and Surabaya. They also expect the government to provide basic facilities and infrastructure in more peripheral locations so that they can have concession to operate there. Cargo owners unwilling to invest have difficulties to get suppliers in peripheral locations, as explained in Section 6.1.1. Central government unwilling to invest stresses that it is not their responsibility and that peripheral port is not the focus in national planning.

Strategies to reduce common method bias and social desirability bias has been discussed in Section 3.3.4 such as by using indirect questioning, protect respondent anonymity and counterbalance order of questions (Fisher 1993; Podsakoff et al. 2003, pp.887-888). This has been applied for the interviews. Therefore, respondents' answers on willingness should be representing their company/institution's perception and not social desirability bias.



Source: Author

Figure 6.6 Findings on Stakeholders' Willilngness to Invest by Stakeholder Type

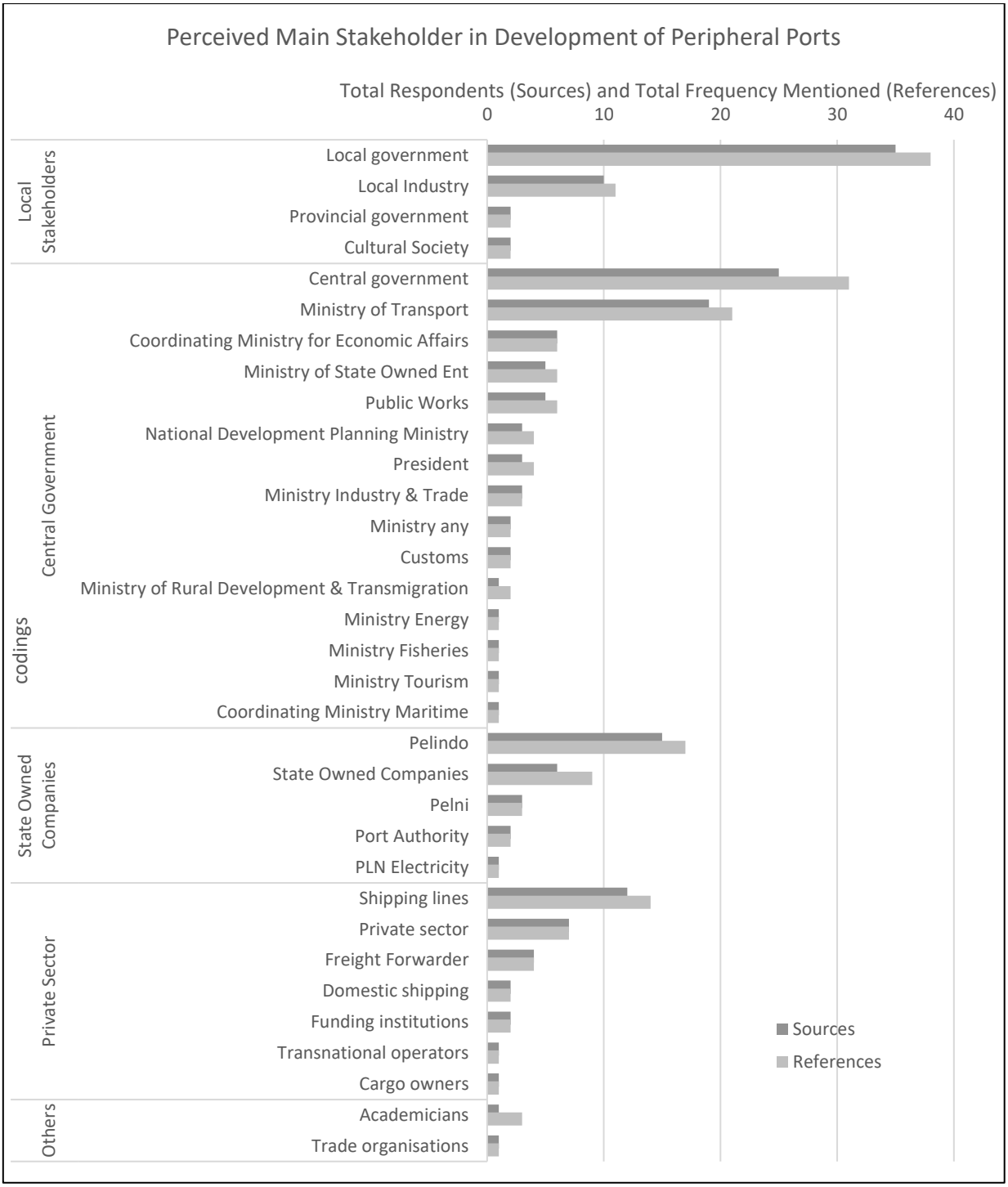
Overall, stakeholders's willingness to invest respectively, from ‘already investing’ to ‘unwilling’, are in this order: Shipping lines (domestic and international), domestic port operators, central government, local government, cargo owners, funding institutions, logistics companies and international port operators. Different reasons for willingness to invest might appear within the same stakeholder type because each stakeholder have different ownership, different business location (customer, supplier and raw material), different goals and different financial conditions. A summary of findings on willingness to invest is presented in the following box 6C.

Findings Box 6C:
Stakeholders which has already invested and willing to invest are dominantly from shipping lines and domestic port operators. Meanwhile, stakeholders unwilling to invest are international port operators. Different reasons for willingness to invest might appear within the same stakeholder type because each stakeholder have different ownership, different business location (customer, supplier and raw material), different goals and different financial conditions.

6.1.4 Stakeholders’ Roles in Peripheral Port Development

Lastly, this section addresses to understand stakeholders’ role and interactions between each other. It also aims to understand which stakeholder should become coordinator/integrator in peripheral port development. During the interviews, respondents were asked who they perceived as main stakeholders in the development of peripheral ports. Their responses are compiled and classified into 5 categories, shown in Figure 6.7. This classification is sorted by public-private background to be aligned with the Port Ownership Model by World Bank (2001), as explained in Table 2.5 Section 2.1.4. These categories are ‘local stakeholders’, ‘central government’, state-owned companies, private sector and others.

Responses most frequently mentioned are as follows: Local Government (35 sources) and Local Industries (10 soures) from the local stakeholders category; Central Government (25 sources) and Ministry of Transport (19 sources) from the central government category; *Pelindo* State-owned port operators (15 sources) from the State-owned companies category; and Shipping Lines (12 sources) from the private sector category. These stakeholders mentioned are similar to the responses during preliminary interviews (Table 3 in Appendix 2). Therefore, it shows that it confirms the stakeholder identification that has been done in literature review and preliminary interviews. More specific type of stakeholder such as Local Industries, Ministry of Transport and Pelindo are the most mentioned.

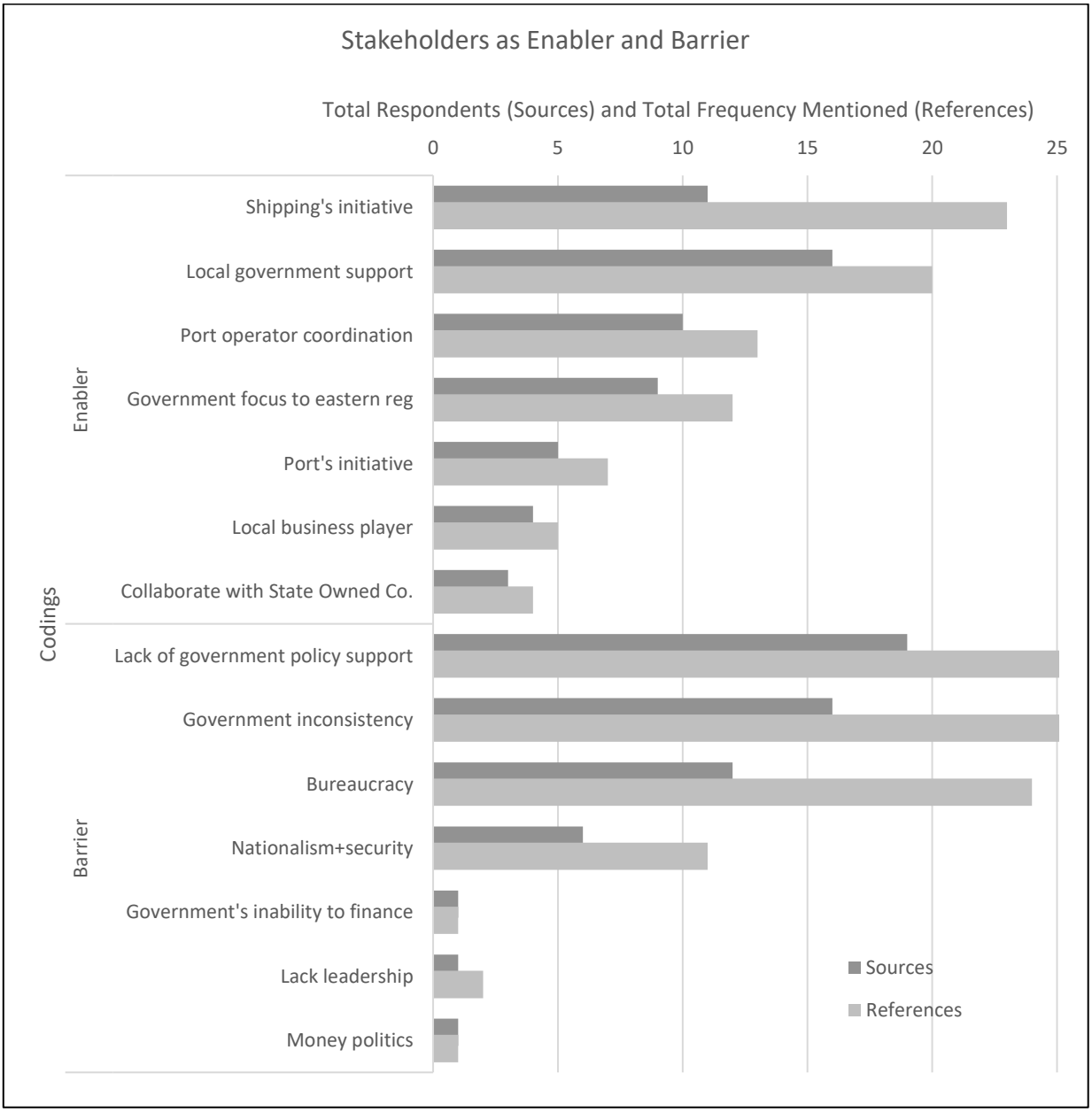


Source: Author

Figure 6.7 Perceived Main Stakeholder in Development of Peripheral Ports

Moreover, their responses are also compiled as Enabler and Barrier, shown in Figure 6.8. Stakeholders' actions as enablers for peripheral port development are respectivlye as follows: shipping line's initiative, local government support, port operator coordination, government's focus to eastern region, port's initiative, local business player's initiative and collaboration with state owned companies. Meanwhile, stakeholders' actions as barrier are lack of government

policy support, government inconsistency, bureaucracy, government's nationalism/protectionist action for security, government's inability to finance, lack of leadership and money politics.



Source: Author

Figure 6.8 Perceived Stakeholders's Action as Enabler and Barrier

It is seen in Figure 6.8 how the government is under difficult position among the stakeholders and pressure. Respondents expects government policy support for development in more peripheral locations eventhough they have promised to focus on the eastern region. Responses coded as government inconsistencies are problems that arise from unsynchronised planning documents, different decisions caused by changing leaderships in the government offices or ministries, unclear concepts on planning document or policies, unclear implementation plans or lack of guidance for practitioners.

Another important finding to highlight here are two of the shipping initiatives as enabler. First, is their initiative to open services to more peripheral locations as their Corporate Social Responsibility (CSR) programmes. They started making a call to some ports in the eastern region eventhough not frequently. They collaborate with local producers, they understand which commodities there are to transport out of the region. They even helped the port to initiate containerisation. As example, a shipping line respondent stated it was the company owner's willingness initiative to expand services to more ports in the eastern region so that they could *"help their brothers/sisters there in order to live a decent life"* (SL_2). Another example, a shipping line respondent stated their company's initiative and CSR programme aims to help outports enabling trade, *"open their access to the world and the world's access to them"* (SL_5).

Second, is their initiative to collaborate with domestic shipping lines. In this strategy, international shipping lines are taking the local cargo carried by domestic lines from the main hubs like Jakarta or Surabaya, then taking them further outward to global hubs such as Singapore or Hong Kong. This strategy is also related to their operations being constrained by Cabotage law. An international shipping line explained this strategy as follows, *"There are potential cargoes here, however, I don't have containers, I can not carry them. They have little import, and lots of export cargoes. If I bring their import cargo, it will be costly. Our way to reduce cost is by giving the job to others (collaborating with domestic shipping lines). He will bring the export cargoes until here (main hub Jakarta), then my cost is stops there…. This also brings benefits for the domestic shipping because, for example from Palembang (more peripheral), he helps us deliver cargo from Palembang to Jakarta which is a smaller volume. He doesn't need to deliver it to Singapore directy from Palembang. He gets benefit from us. Another benefit is to Indonesia as well because we are using Jakarta as the hub, not to Singapore. This relates with our nationality, which is how to make our transhipment port alive, doesn't have to go to Singapore, Tanjung Pelepas or Laem Chabang" (SL_8).*

Overall, findings on stakeholders' roles in peripheral port development is summarised in the following Findings Box 6D. From their perception, stakeholders who should be responsible in the development of peripheral ports are local government, local industries, central government, Ministry of Transport, Pelindo (state-owned port operators) and shipping lines. perception on importance of peripheral locations is dominantly important to reduce inequality. There are also stakeholders' actions which contributes to become enabler and barrier for peripheral port development. Most mentioned stakeholders' actions are shipping lines' initiative as enabler and

government inconsistency as barrier, which indicates how difficult it is for the government in the development of peripheral ports.

Findings Box 6D:
Perceived main stakeholders in the development of peripheral ports are local government, local industries, central government, Ministry of Transport, Pelindo (state-owned port operators) and shipping lines. Most mentioned stakeholders' actions are shipping lines' initiative (enabler) & lack of government policy support (barrier).

6.2 Findings from Survey

Findings from survey consists of descriptive statistics, EFA on willingness to invest and post-hoc analysis. Prior to that, the development of survey questionnaire for item variables in X8 – Willingness to Invest is described. The final part of the survey questionnaire aims to measure willingness to invest and answer the fourth research question. It is not intended to adapt willingness-to-pay as in the economic studies. It does not seek a certain point or price which makes customer's perception change on a particular product/service. Hence, the wordings for the survey questionnaire were: ***"we are willing to invest in expanding business/project in peripheral locations if..."***.

Item variables identified from literature related to willingness to invest used item questions from Guy and Urli (2006), as explained in Table 2.2.8 Section 2.4.3 and Section 3.3.1. However, not the whole set of their item variables are used. Only the main idea of transit cost and port service advantage as trade off are used to measure respondents' willingness to invest. Three item questions adapted from Guy and Urli (2006) are as follows (see Table 6.2): *"we get twofold transit cost advantage" (X8.1); "we get twofold port service advantage" (X8.2); "we get twofold transit and port service advantage" (X8.3).* As seen in Table 6.2, findings from interviews shows that none of the item questions by Guy and Urli (2006) are mentioned. None of the respondents mentioned their willingness to invest if they could get cheper transit cost and port service advantage. This might be because respondents do not think of their operational cost after expanding their business in more peripheral locations.

Furthermore, there are four emerging items identified in interviews to be included in the survey questionnaire. They were selected from the dominant codings on critical facilities needed in peripheral ports (Figure 4.6 Section 4.1.2) and perception on willingness to invest (Figure 6.5). These items are as follows: *"if they get a dedicated a terminal" (X8.4); "get storage cost advantage" (X8.5); "can contribute to economic growth in the region" (X8.5); "become first to dominate the business/market in the region" (X8.5)*. These emerging item variables are described in Italic. A final open question is provided for respondents to fill in the blank.

Table 6.2 Item Variables in Willingness to Invest (X8) Identified from Interviews Results

Code	Factors and Item Variables	Interview Results						
		PO	**SL**	**LC**	**CO**	**CG**	**LG**	**FI**
X8	**Willingness to Invest**							
X8.1	We get twofold transit cost advantage	-	-	-	-	-	-	-
X8.2	We get twofold port service advantage	-	-	-	-	-	-	-
X8.3	We get twofold transit and port service advantage	-	-	-	-	-	-	-
*X8.4**	*We get a dedicated terminal*	*0*	*3*	*0*	*2*	*0*	*0*	*0*
	Example quote: "This has never been discussed, but as far as I know, our competitor in the Philipines are doing that (developing a dedicated terminal). Hence, I think we are open if Pelindo want to upgrade and needs investors, we are open" (CO_5).							
*X8.5**	*We get twofold storage cost advantage*	*2*	*3*	*0*	*5*	*0*	*0*	*0*
	Example quote: "Either the warehouse is full or empty, still it needs to be provided because it is the minimum requirement of a port. This goes to container yard as well. There are various requests from cargo owners, there are also request to exit the port directly without storage" (PO_2).							
*X8.6**	*We can contribute to economic growth in ther region*	*0*	*0*	*0*	*0*	*1*	*0*	*1*
	Example quote: "The second thing to look at (before giving our loan) is whether there is impact from the infrastructure development. Hence, we need to see this impact" (FI_5).							
*X8.7**	*We can become the first to dominate the business/market in that area/region*	*0*	*2*	*0*	*0*	*5*	*2*	*0*
	Example quote: "We started containerisation in the eastern region in the year 2000 in Sorong port. It was done by myself with 14 of my friends… The idea or initiative was from the owner of this company… As a healthy company, of course we are willing to do it (expand business). Yesterday we went to see Ketapang in Pontianak, as example, but it was constrained by the draft depth. We have been there twice" (SL_2).							
X8.8	*Others (fill in the blank)*							

Annotation:
The numbers explains how many times it is referenced in the interview.
'-' means that there is none of the code explains the item variable
*)Variable added from interview results

Source: Author

6.2.1 Descriptive Statistics on X8 – Willingness to Invest

The following Table 6.3 describes the descriptive statisticis for the 8 items in variable X8 (Willingness).

Table 6.3 Descriptive Statistics for Items in Variable X8 - Willingness

	Item Variable	Min	Max	Mean	Std. Dev	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
X8.1	We get twofold transit cost advantage	1.0	7.0	4.99	1.30	-.897	.189	1.281	.376
X8.2	We get twofold port service advantage	1.0	7.0	5.17	1.29	-1.282	.189	1.817	.376
X8.3	We get twofold transit and port service advantage	1.0	7.0	5.13	1.18	-1.133	.189	1.604	.376
X8.4	We get a dedicated terminal	1.0	7.0	4.98	1.28	-.742	.189	.355	.376
X8.5	We get twofold storage cost advantage	1.0	7.0	5.10	1.22	-1.106	.189	1.605	.376
X8.6	We can contribute to economic growth in the region	1.0	7.0	5.22	1.25	-1.171	.189	1.602	.376
X8.7	We can become the first to dominate the business/ market in that area/region	1.0	7.0	5.10	1.32	-1.045	.189	1.198	.376
X8.8	Others (fill in the blank)	1.0	7.0	4.79	1.75	-.907	.189	-.045	.376

Source: Author

Items with the highest mean or willingness are ‘We can contribute to economic growth in the region’ (X8.6). The lowest importance is item ‘We get a dedicated terminal’ (X8.4) and Others (X8.8). Overall, the 8 items are detected as normal from its skewness and kurtosis statistics within ±2.58 and a significance level of 0.01 (Hair et al. 2010, pp.72-76). Other reasons for willingness are asked in item question X8.8 and their responses are also shown in Table 6.4.

6.2.2 EFA on Willingness

Procedures conducted in EFA for the latent variable Willingness (X8) is summarised in Table 6.5. Similar to Table 5.17 in Section 5.2.3 which shows the procedures and results of EFA for the 7 latent variables, Table 6.5 also explains requirements in EFA and results for X8. The detailed output from IBM SPSS for this procedure are shown in Appendix 8 Table 1.

Kaiser-Meyer-Olkin (KMO) to indicate sampling adequacy (Field 2018, p.798), has shown a ‘meritorious results’ which is 0.905. Bartlett’s test of Sphercity is significant under 0.05. Initial unrotated results shows Communalities are above 0.30 except for X8.8 (willing for other reasons). Communalities value below 0.3 means the item does not fit well with oher items in its component (Pallant 2016, p.200), hence, it is reasonable if X8.8 does not fit well because it is an open question for respondents. X8.8 is then still analysed in EFA and will be examined in more detail after the EFA results are achieved. After using Varimax rotation, results show that the 8 item variables are represented by 1 factor, with percentage of variance explained is 60.45% and factor loadings for the items varies between 0.4 to 0.9.

Table 6.4 Respondents' Answers for Item Variable X8.8 - Other reason for Willingnes

Stakeholder Type	X8.8 - Other reason for Willingnes
Port Operators	- If we are able to expand business as optimal as possible, ease of doing business, and sufficient market - If there is consistent policy and regulation, even if the government regime changes, regulaltion on cooperation with private sectors - To improve national connectivity - If basic infrastructure is available (access, energy, permit) - If we get priority in port service, or concession for a long period of time - If central government gives full support, by access and regulations - Transhipment operations are not complicated
Shipping Lines	- If there is market/niche volume in the region - If there is no monopoly, easy to do collaboration/cooperation, state-owned companies do not monopolise - If local people are stable, local wisdom is up-hold to expand business - If we have capital to expand business/invest - If it is convenient, save, no congestion, cargo and passenger service is separated, clear window schedule, good port infrastructure - If there are clear policies, not changing and ease to invest
Cargo Owners	- If there are insentives, discount from the port or subsidy from government - If port service is sufficiently fast, effective, simple clearance process - If access to the port has a special tol road, good infrastructure - If the port is linked to our business interest - If tax policies are easy
Logistics Companies	- If we get incentives from central and local government - Very unwilling - To create alliance - If facilities in the region is standardised with international level, the port is professional - If we get dedicated depot, safe and facilities are complete, easy to access information on schedule - If business is sustainable, there is certainty and protection for investments - To improve local/regional economy
Central Gov.	- If there is enough energy (electricity) and human resource - If licensing is faster, easy to invest - If the policies are supportive
Local Gov.	- If we are free from local retribution or tax
Funding Institutions	- If there is efficient bureaucracy, transparency and clear law
Other Stakeholders	- To provide good quality human resources - If we get a long period of concession and feasible return on investment - If cargo traffic is guaranteed from the nearest hinterland - If we get tax incentive - If bureaucracy is not difficult, clear and consistent policies to support invesments - If the government socialise every changes in policy related to ports - If there is strong collaboration between private sector, local and central government

Source: Author

Considering that factor loadings between ±.30 to ±.40 are the acceptable minimal level for interpretation of structure (Hair et al. 2010, p.117), hence, willingness to invest as 1 factor with its 8 items is acceptable. Moreover, with Alpha Cronbach = 0.890, AVE = 0.605 and CR = 0.922, shows the construct is valid and reliable. From here on, X8 is named as 1 factor: Willingness to invest (W).

Table 6.5 Procedures in Exploratory Factor Analysis (EFA) for Willingness (X8)

No.	Procedures and Tests	Requirements	Results in this study	Interpretation
1.	Factor Extraction Method	It should be decided to choose between Principle components analysis (PCA) or Common Factor Analysis (CFA), which differ in whether total variance or common variance is analysed (Hair et al. 2010, pp.106-107).	PCA is used because it is better for research focusing on data reduction.	PCA is used in the IMB SPSS 23 software.
2.	Initial Unrotated Results	• Total variance explained • Communalities	Communalities are above 0.50 except for X8.8.	Acceptable.
3.	Determine Rotational Method	It should be decided to choose which rotational method to be used (Hair et al. 2010, pp.112-116). • Total variance explained • Communalities • Rotated component matrix	Varimax (Orthogonal) is used because the structure is fundamentally simple and give a clearer separation of factors.	
4.	Determine the number of factors as output	These values are used as considerations (Hair et al. 2010, p.111). • Scree Plot • Factors with eigenvalues greater than 1.0 • Enough factors to meet a specified percentage of variance explained, usually 60% or higher • No cross loadings	After comparing several alternatives, it is determined that having 1 factor is the best choice. Percentage of variance explained is 60.45%	8 items are now represented by 1 factor.
5.	Results of Varimax 1-Factors	EFA results are explaind by these output (Hair et al. 2010, pp.116-122). • Total variance explained • Factor Loadings • Reproduced correlation matrix showing non-redundant residuals less than 50%, explained in Field (2018, p.812)	Adequate results which fulfilled the minimum requirements.	Acceptable.
6.	Validity and Reliabilty	Validity and reliability are explaind by these output (Hair et al. 2010, pp.125-126, pp.708-710): • Scale reliability: Alpha Cronbach >0.7 • Convergent validity: Factor loading >0.5; CR>0.7; AVE>0.5 • Discriminant validity: No strong cross-loading • Nomological validity: makes sense based on theory	Factor Loadings for the items varies between 0.4 to 0.9. Alpha Cronbach is 0.890. AVE is 0.605 and CR is 0.922.	Factor loading are acceptable. The model is considered reliable and valid.

Source: Author

6.2.3 Post-Hoc Analysis

Post-hoc tests are used to investigate dependent variables between possible pairs of group differences, which are tested after data patterns are established (Hair et al. 2010, p.473). In this section, two types of test are conducted. First, is to compare the median of willingness to invest between stakeholders. Second, is to see whether there are correlations between Factor-1 (F1), Factor-2 (F2) and Factor-3 (F3). These tests are summarised in Table 6.6.

Comparing Median of Willingness to Invest between Stakeholders

Similar to comparing median after EFA results in Section 5.2.5, in this section, median is compared for the W between stakeholders. Summated scales for W is used to enable replication of work in further studies (Hair et al. 2010, p.144). Non-parametric tools are also used to ensure sufficient statistical power for small sample sizes under 20 or under 30 responses (Hair et al. 2010, p.453; Pallant 2016, p.214). However, in Section 5.2.5 comparison is done between F1, F2 and F3 with related conditions (within group) because they were answered by the same respondents. Here, comparison is done between groups of stakeholders. Therefore, Kruskal-Wallis test is used.

The Kruskal-Wallis is a non-parametric test to compare groups or conditions with unrelated or independent scores (Field 2018, p.306). The results are summarised in Table 6.6. Kruskal-Wallis test shows that there is no statistically significant difference in W between different stakeholder type, Chi-square (9.813) and the significance value (sig 0.199). Having significance value larger than 0.05, it could be concluded that the stakeholder type does not significantly affect Willingness to Invest (W).

This result can be questioned further, since stakeholder willingness to invest from the qualitative interviews shows that they are different between stakeholder type (see Figure 6.6 in Section 6.1.3). Moreover, responses for other willingness in Table 6.4 shows that stakeholders are not concerned with transit cost (X8.1), port service cost (X8.3) and both combined (X8.3). This is consistent with their responses during the interview (Section 6.1.3 and Table 6.2 in Section 6.2.1), in which there are no interview codings found for those three items originated from Guy and Urli (2006). Hence, new summated scales are created to split W into two groups of items: W1 which represents item variables from literature (X8.1 to X8.3) and W2 which represents item variables from interview results (X8.4 to X8.8).

Kruskal-Wallis test for W1 shows that there is no statistically significant difference in W1 between different stakeholder type, Chi-square (5.896) and the significance value (sig 0.552).

Surprisingly, Kruskal-Wallis test for W2 shows that there is a statistically significant difference in W2 between different stakeholder type, Chi-square (14.14) and the significance value (sig 0.049). The median value of W2 for stakeholders respectively are as follows: central government (5.5), port operator (5.4), shipping line (5.4), logistics companies (5.2), local government (5.0), funding institutions (5.0), cargo owners (4.8), others (4.8).

Correlation of F1, F2 and F3 to W

Spearman Correlations Test is a non-parametric statistic tool to investigate correlation between variables, by first ranking the data then applying Pearson's equation to the ranks (Field 2018, p.351). The results in Table 6.6 shows that there is significant correlation between F1, F2 and F3 to W. The coefficient determination R^2, is also calculated to understand the measure of the amount of variability in one variable which is shared by the other, by squaring the Spearman Rho coefficient (Field 2018, p.350). Results shows that the R^2 for F1-W is 0.052, which means that F1 shares 5.2% of the variability with W. The R^2 for F2-W is 0.075, which means that F1 shares 7.5% of the variability with W. Meanwhile, the R^2 for F3-W is 0.042, which means that F1 shares 4.2% of the variability with W.

Furthermore, Kendall's Tau is a similar test to Spearman's which is better used in small data set with large number of tied ranks, in other words if there are many scores having the same rank (Field 2018, p.353). Kendall's Test has been conducted to validate results from the Spearman's test. Results of Kendall's test are consistent with the Spearman's test. Correlation tests are also conducted for W1 and W2. The factors F1, F2, and F3 have significant positive correlation with W, W1 and W2 (details in Appendix 8 Table 2).

Overall, findings from survey on willingness to invest are presented in the following Findings Box 6E. It can be concluded that the EFA has grouped the 8 item variables into 1 Factor to represent willingness to invest in peripheral ports and peripheral locations (W). There are significantly no differences in the median of W for each stakeholder. Furthermore, F1, F2 and F3 are all correlated to W.

Findings Box 6E:
EFA has grouped the 8 item variables into 1 Factor to represent willingness to invest in peripheral ports and peripheral locations (W). There are significantly no differences in the median of W for each stakeholder. However, there are significant differences of W2 (items X8.4 to X8.8) for each stakeholder type. Respondents with the highest median for W2 respectively are central government, port operator, shipping line, logistics companies, local government, funding institutions, cargo owners and others. Furthermore, F1, F2 and F3 are all correlated to W.

Table 6.6 Post-Hoc Analysis

No.	Procedures and Aim	Results	Interpretation
1.	Kruskal-Wallis test for W To test whether the median of willingness to invest (W) is significantly different for each stakeholder type.	Chi-square of 9.813 and significance value of 0.199.	There is no significant difference of W between the groups.
2.	Kruskal-Wallis test for W1 (representing item variables X8.1 to X8.3)	Chi-square of 5.896 and significance value of 0.552.	There is no significant difference of W between the groups.
3.	Kruskal-Wallis test for W2 (representing item variables X8.4 to X8.8)	Chi-square of 14.14 and significance value of 0.049.	There is significant difference of W between the groups.
4.	Correlation test (Spearman) To test whether Factors from EFA correlates with Willingness to Invest (W).	• F1 (summated scale) significantly correlates to W, with Spearman's Rho of 0.229 and significance value of 0.003. • F2 (summated scale) significantly correlates to W, with Spearman's Rho of 0.274 and significance value of 0.000. • F3 (summated scale) significantly correlates to W, with Spearman's Rho of 0.207 and significance value of 0.008.	There is significant correlation between F1, F2 and F3 to W.

Source: Author

6.3 Discussion

There are 2 main points to be discussed related to willingness and stakeholders' behaviour, as a result of comparing findings from main interviews with relevant literature. The following Table 6.7 compiles a summary of findings from qualitative and quantitative phase (from boxes 6A to 6E), relevant literature and discussion points. Items in the 'Findings' and 'Relevant Literature' columns are the basic premises to build arguments in 'Discussions' column.

Table 6.7 Findings, Relevant Literature and Discussions in Chapter 6

Findings	Relevant Literature	Discussions
Findings from Interviews are: **Findings 6A:** Stakeholders located in (or closer to) the main hubs are based on their business ownership, location of their customers and supply chain/suppliers. Stakeholders located in more peripheral locations are related to legal authorisation and location of its raw material. Stakeholders without considering their locations are focused on feasibility and profitability of their client's projects. **Findings 6B:** Peripheral locations are dominantly perceived important to reduce inequality. Other reasons for importance and unimportance vary by stakeholder type. **Findings 6C:** Stakeholders which has already invested and willing to invest are dominantly from shipping lines and domestic port operators. Meanwhile, stakeholders unwilling to invest are international port operators. Different reasons for willingness to invest might appear within the same stakeholder type because each stakeholder have different ownership, different business location (customer, supplier and raw material), different goals and different financial conditions. **Findings 6D:** Perceived main stakeholders in the development of peripheral ports are local government, local industries, central government, Ministry of Transport, Pelindo (state-owned port operators) and shipping lines. Most mentioned stakeholders' actions are government's port policy (enabler) & government inconsistency (barrier).	1.5 Research context on Indonesia; 2.1.3 Development of peripheral ports; 2.1.4 Transport development models and port hierarchy; 2.1.5 Peripheral port challenge; 2.1.6 Rise of secondary hub ports and direct call of shipping lines; 2.2.3 Transhipment operations; 2.2.4 Maritime network 2.3.1 Stakeholders in Maritime Economics; 2.3.3 Willingness in Maritime Economics 2.4.3 Selection of most related studies and variables. 3.1.7 Stakeholder Theory	6.4.1 Pattern of Stakeholder Willingness to Invest; 6.4.2 Division of Task between Government and Private Sector; 6.4.3 Empowerment of Local Government and Local Business
Findings 6E: From Survey are: a. Descriptive statistics b. EFA 1-Factor for willingness to invest: EFA has grouped the 8 item variables into 1 Factor to represent willingness to invest in peripheral ports and peripheral locations (W). c. Post-hoc analysis with Kruskal-Wallis Test; Spearman correlation test: There are significantly no differences in the median of W for each stakeholder. However, there are significant differences of W2 (items X8.4 to X8.8) for each stakeholder type. Respondents with the highest median for W2 respectively are central government, port operator, shipping line, logistics companies, local government, funding institutions, cargo owners and others. Furthermore, F1, F2 and F3 are all correlated to W.		

Source: Author

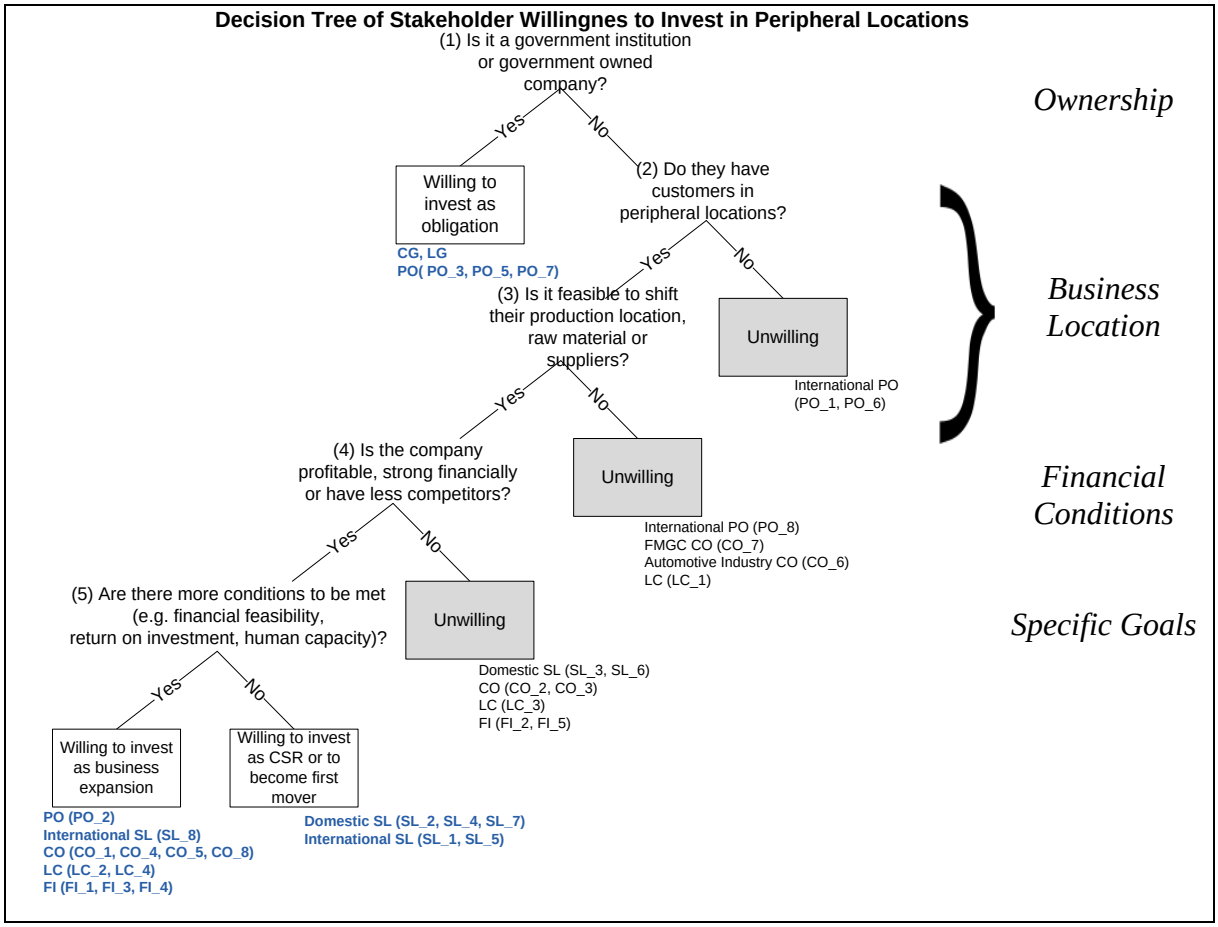
6.3.1 Pattern of Stakeholder Willingness to Invest

Decision Tree for Willingness to Invest in Peripheral Locations

This discussion argues that there is a pattern in stakeholders' willingness to invest. This pattern is described in a Decision Tree diagram (Figure 6.9). It is understood from literature reviewed in Chapter 2 that peripheral port challenge occurs because of locational factors, institutional factors or other factors related to the rise of transhipment, more improvements on port infrastructure and performance (Section 2.1.5). There are also strategic actions done by international port operators and shipping lines motivation to get more flexibility, accessibility to market, change routes and likelihood for a changing port hierarchy (Section 2.4.3 on deconcentration factors).

Interview and survey results support the related literature. Findings shows that there is a distinct current or movement from parts of the stakeholders' responses which represents willingness to invest. They perceive peripheral locations important to reduce inequality (Section 6.1.2). They are dominantly from shipping lines and domestic port operators, willing to invest or even already investing to add facilities in feeder ports, add ships or add new routes (Section 6.1.3). Item variable with the highest mean score from survey results shows that respondents are willing to invest if they can 'contribute to economic growth in the region' - X8.6 (Section 6.2.1).

Moreover, findings from Section 6.1.1 on stakeholders' business location, Section 6.1.2 on importance of peripheral locations and Section 6.1.3 on willingness to invest are consistently showing the same results. They indicate that decision on business location, business expansion and willingness to invest are based on 4 main aspects: 1) ownership; 2) business location (customer, supplier, raw material); 3) financial conditions; 4) specific goals (e.g. to conduct Corporate Social Responsibility, support the government, improve human capacity, etc.). A decision tree is considered appropriate to represent this. Decision tree is a diagram generally used in data mining as a quantitative method. Furthermore, it can also be used in qualitative data analysis. Decision trees are used to build a logical chain of evidence (Miles and Huberman 1994, p.261). Its feature is helpful for researchers because it shows sequences of events and also could focus on the logical cnosequences of decisions (Gladwin 1989 cited in Miles and Huberman 1994, p.261).



Source: Author

Figure 6.9 Decision Tree of Stakeholder Willingness to Invest in Peripheral Locations

As seen in Figure 6.9, the 4 aspects represent discussed earlier becomes the branches of the tree, while stakeholders' decisions are represented by the leaves which are unwilling (grey boxes) or willing (white boxes). Decision on location to start business and to where the business expansion should be is seen here. First, the business needs to satisfy its owner or shareholders. The first branch shows how the government institutions or state-owned companies are willing to invest in more peripheral locations as their obligation if they are authorised to serve those particular locations. Meanwhile, firms that are in the private sector would not be willing to invest, hence, further continue their decision to the second and third branch.

Second, the business needs to locate its customers, suppliers or raw material because it directly influences their product, service or operations. This is reflected by the second branch. International port operators are unwilling to invest in more peripheral locations because they aim to serve large ships as their customers in the hub ports. They are aiming the bigger/wider market or international trade with high volume of cargoes. On the third branch, stakeholders who are unable to shift their location of production, suppliers or raw material are unwilling to

invest in more peripheral locations. Respondents identified in this situation are international port operators and cargo owners with complicated manufacturing operations (e.g. FMCG, automotive).

Third, the business needs to identify its profitability, financial strength, and position towards its competitors. This is reflected by the fourth branch. Domestic shipping lines and logistic companies who considers themselves in difficult financial situation or facing difficult competition are unwilling to invest. One of the respondents from domestic shipping lines in this position expressed themselves as follows, *"We focus on serving Nusa Tenggara region… if there is a chance, we would want to increase our ship size" (SL_3)*.

Lastly, the business needs to fulfil its specific goals, which is reflected by the fifth branch. Port operators, shipping lines, cargo owners, logistic companies or financial institutions in this position are willing to invest as business expansion when they have met conditions such as financial feasibility, return on investment or having sufficient human capacity. The project must be 'do'-able. If they have considered those conditions, then they will be willing to invest for specific goals to reach. Examples for these are the shipping line's initiative, coded as 'enabler' by creating CSR programme to open their service to more peripheral locations and collaboration with local producers, as explained in Section 6.1.4.

Stakeholder Theory and Willingness to Invest

Findings from interview and survey in this chapter has shown that a logical chain of evidences exist and that stakeholders' willingness to invest could be described in a decision tree. Moreover, in qualitative methods the next step is to establish conceptual/theoretical coherence (Miles and Huberman 1994, p.261). The purpose is to make the findings tied or overarching in explaining the 'how' and 'why' of the phenomena of the study (Miles and Huberman 1994, p.261). This discussion argues that the pattern which explains stakeholders' willingness to invest is aligned with the theoretical lens of the Thesis.

It is understood that Stakeholder Theory is used as theoretical lens because it supports to shape approaches to the empirical reality and provide 'a way of seeing' and 'not seeing' things (Astley and Van de Ven 1983 cited in Touboulic and Walker 2015, p.20), as explained in Section 3.1.7. The emergence of Stakeholder Theory had a noble purpose which was to make businesses consider the needs of all related stakeholders, instead of just their shareholders (Freeman 1984; Freeman et al. 2004; Freeman 2012). To be a successful business/firm in the long-term is then not only to gain profit, satisfy shareholders, suppliers and customers, but also

be fair and ethical (Freeman 1994; Clarkson 1995; Sternberg 1997). Hence, a firm should map all of its related stakeholders and make good relationship with them.

The four aspects as branches of the decision tree also reflects how a firm maps its stakeholders and the level of priority for each of them. The four aspects at the right side of Figure 6.9 from top to bottom respectively (ownership, business location, financial conditions, specific goals) represents their priority towards their stakeholders. First, they have to satisfy their shareholders and main stakeholders (e.g. customers and suppliers). Afterwards, if they have financially exceeded their shareholder's expectations, they can further on make efforts to satisfy distant or indirect stakeholders. Linking back to maritime transport literature, these distant or indirect stakeholders could be customers in more peripheral locations such as peripheral/feeder ports, feeder ships, local business players or local cargo owners.

Evidence found from shipping line's initiatives, coded as one of the enablers in peripheral port development in Section 6.1.4, also confirms this view on Stakeholder Theory. From the two shipping lines' initiatives (CSR programme and collaboration with domestic shipping line), it is seen how the shipping lines are aiming to open new services to also gain first mover advantage. They also are trying not to compete with domestic shipping lines that already has high market share in more peripheral locations. These initiatives are giving benefits not only for themselves, but also for their customers and indirect customers. If cargo volume increases because of their strategic actions, by satisfying indirect customers, they could also get long-term benefits for their business.

The decision tree could be useful to identify in general whether a business/firm would want to invest in peripheral ports or to more peripheral locations in other countries or regions with developing economies. The model established here is based on qualitative data, hence, it could be done for future research to model them in more precise with quantitative measurements. Decision on willingness to invest is compared with results from Survey in Section 6.3.3.

6.3.2 Division of Tasks between Government and Private Sector

This discussion argues that there should be a clear division of tasks between the government and private sector. It is understood from literature reviewed in Chapter 2 that government has a critical role in the development of peripheral ports, either in Small Island Developing States (SIDS), developing or developed countries (Section 2.1.3). Concentration and deconcentration factors identified in the literature mentions the government's intervention to some extent to initiate or intensify cargo concentration/deconcentration in ports, such as national and regional

development planning, government support and regulations, political stability, policy and port devolution (Table 2.26 and Table 2.27 in Section 2.4.3).

Besides the government, private sectors are also involved. Literature review explains how peripheral port challenge occurs because of institutional factors, especially in developing countries in Asia (Section 2.1.5). Institutional factors represents how the port authorities, terminal operators and shipping lines collaborate (Slack and Wang 2002, p.164)., such as the strategic actions of global/international terminal port operations to expand their business in more peripheral locations in China. Stakeholders in Maritime Economics literatre has been identified and more studies are looking at the private sector compared to central and local government (Table 2.22 in Section 2.3.1).

Interview and survey results support these related literatures that both are needed. Qualitative findings show that stakeholders perceive peripheral locations important mostly to reduce economic inequality and an obligation for the government and state-owned companies (Section 6.1.2). It also shows that stakeholders which has already invested and willing to invest are dominantly from shipping lines and domestic port operators, followed by the central government (Section 6.1.4). The quantitative survey is aligned, having the results of statistical tests showing that the three most willing stakeholders are the central government, port operator and shipping lines (Section 6.2.3). The critical factors identified from EFA also shows that item variables related to government support are very much close to items on private sector involvement, hence, they are grouped in Factor-2 (Section 5.3.1).

However, some responses in the interviews also mentions that stalemate exist, in the analogy whether the ‘chicken or egg’ which comes first, who should initiate peripheral port development, is it the government or private sector first? Hence, it is argued here that there needs to be a division of task between government and private sector. More specifically are two main points, which are the critical role of government and private sector’s willingness to sacrifice profitability.

Critical Role of the Government

Findings shows that government’s role in peripheral locations is critical. The stakeholders from private sector perceives peripheral locations are important for reducing inequality, for its potential, for sales and marketing, also important as government focus (Section 6.1.2). Shipping lines are willing to invest, and some has even invested (Section 6.1.3). It is seen that stakeholders has expectations from the central government for the development of peripheral

ports and business in more peripheral locations, such as to provide supporting policies, to reduce inconsistencies and ease bureaucracy (Section 6.1.4). It would be a futile attempt when the government does not create suitable conditions or environment to support the private sectors already willing to invest. As example, a cargo owner respondent stated, *"in peripheral locations, the government should provide facilities, impossible for private sectors because private sectors are only concerned for their interest" (CO_4).*

A similar logic to ports having a minimum diversion distance to be included in the main shipping routes (Notteboom 2005; Baird 2006), the cutting point of where one place is considered peripheral or not should be clarified between the public (government) and private sector. It should be communicated between public and private sectors in how far they are able to provide services. Which activities, function or even which shipping routes should be handled by the government, which to be transferred and carried on by the private sector.

There are respondents from private sectors which raised the topic that the government should not subsidised profitable routes anymore, since it hinders their business expansion plan. When certain routes are becoming more and more profitable, the government should let them go or hand them off to private sectors and focus subsidies on opening new peripheral routes. They expect the government to provide healthy environment for competition in locations that are less peripheral, as well as continuing to provide services in the most peripheral locations where they could not enter.

This means a clear division of tasks is needed and it is the government's responsibility to determine the task division. It should be mapped in which activities, function and locations in which the private sector could not enter because it is not profitable for their business. There are sectors which could be endangered or not running if they are transferred to the private sector, and these sectors should still be in the focus of the government. In sectors concerning safety of the port or security in the region, the government should definitely take the role. For example, the rising security issues in the eastern region of Indonesia and how the government are developing a new naval hub there to strengthen security and improve illegal fishing law enforcement (Section 4.1.3). Another example is that the government could map the locations in which private domestic shipping lines are allowed to enter, which are becoming more profitable, and let go the pioneer services done by the state-owned shipping line (Figure 4.11 in Section 4.1.3).

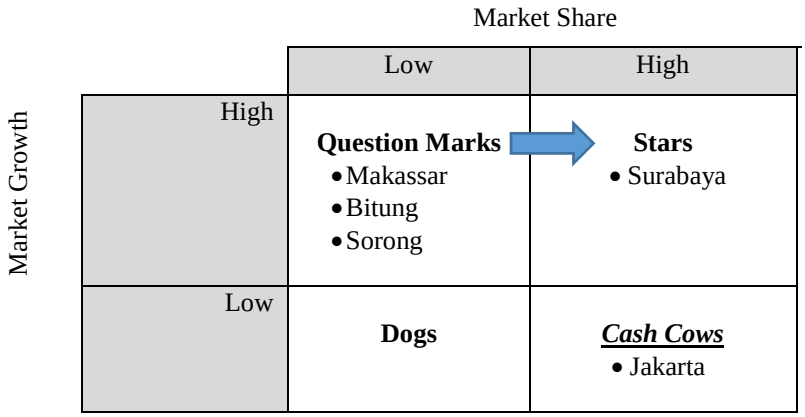
It is seen here that there is a trade-off between security and sovereignity with business expansion and economic development. Hence, the government's role is to identify these sectors and its boundaries and allow private sectors to enter in sectors or locations that could be profitable for them. The advantage of having this transfer is to create competition which could improve service and increase productivity for the end customers and Indonesian citizen's in general. As example in the literature, Canadian and French government are prioritising to transfer their small ports to the private sector compared to local/regional government because they do not want local government to change the industrial function of the small port into tourist attractions and urban functions (Debrie et al. 2007).

Besides identifying or mapping these activities, function or locations to be transferred, central government should improve their weighting or considerations between political and operational aspects of the port hierarchy so that it does not harm or setback economic growth (Section 4.2.2 and Section 4.2.3). They should also allow the private sector to be involved in long-term planning. Item variables in Factor-2 (Clear policy, financed and governance) from the EFA results could be a guideline or good practice for the collaboration between central government and the private sector. These items have been explored from qualitative interviews and confirmed in the survey as the critical items needed for a peripheral port to become a hub (Section 5.3.1), which are as follows: more open to foreign sector involvement, establish sound investment system, prepare financial assistance for investing companies, prepare exclusive contracts policy for dedicated terminal, align planning with the strategy of international operators, support shipping alliance formation, colloboration with shipping line, prepare clear phases of investment (time and amount of investment), involve in CSR programmes, create conditions for less monopoly, formulate government policy to prioritise peripheral ports, align with local and provincial government planning, create political stability, create less bureaucracy and central government to coordinate the collaboration.

Private Sector's Willingness to Sacrifice Profitability

It has been identified that there are peripheral ports in Indonesia's eastern region considered as potential secondary hub ports, which are Makassar, Bitung and Sorong (see Section 4.1.3). Moreover, strategic positioning of ports could be mapped in a Product Portfolio Analysis (Bichou 2009, p.214), adapting the BCG Matrix to achieve maximum competitive advantage as explained in Figure 2.13 Section 2.2.2. Hence, the potential secondary hub ports are mapped in the BCG Matrix in Figure 6.10 to support the author in identifying strategies for them.

Makassar, Bitung and Sorong are positioned in the 'question marks' area because it is considered having high market growth and low market share. The rise of potential cargoes and increasing population in the eastern region (Section 4.1.1) is a proxy for port and maritime transport's high market growth. Their market share is low since they are not used as the dominant hub port for transhipment for local feeders and that transhipment activities are quite low (Section 4.1.2). Meanwhile, Surabaya as the existing main hub for routes to the eastern region are positioned in the 'stars' are because it has high market share for transhipment. Jakarta is positioned in the 'cash cows' because it has and high market share as the main hub for the country, but lower market growth since Java Island's GDP growth is relatively close to that of the eastern region today (Section 1.5.3).



Source: Author

Figure 6.10 Indonesian Hub Ports in the BCG Matrix

The BCG Matrix of Indonesian hub ports show that for Makassar, Bitung and Sorong to move up the port hierarchy and become more profitable, they should shift position to the 'star' and have higher market share. Factors for these potential hub ports to become main hubs have been identified in Chapter 5, by using EFA and 3 factors are identified, which are: Standardised port operations (Factor-1); Clear policy, financed and governance (Factor-2); Positive spatial aspects (Factor-3). Moreover, stakeholder willingness to invest has been identified in Chapter 6. Item variables related to getting lower transit cost and port service cost (items X8.1 to X8.3 as W1) are not significantly creating the different willingness to invest between stakeholders. It is actually the the more indirect and long-term motives (items X8.4 to X8.8 as W2) which is significantly difference between stakeholder types as explained in Section 6.2.3.

Hence, it is seen that the private sector (i.e. port operators, shipping lines, cargo owners, logistics companies, and funding institutions) are actually willing to sacrifice their profitability in the early stages of hub port development in more peripheral locations. Items X8.4 to X8.8 shows that stakeholders are willing to invest in peripheral ports or business in peripheral

locations if they can get the following in return: 'We get a dedicated terminal' (X8.4); 'We get twofold storage cost advantage' (X8.5); 'We can contribute to economic growth in the region' (X8.6); 'We can become the first to dominate the business/ market in that area/region' (X8.7); and other reasons (X8.8 compiled in Table 6.4 in Section 6.2.2). Their responses are useful to become guidelines in planning what incentives should be given to the private sector, to be willing to expand more of their business in peripheral locations.

Moreover, these findings are also consistent with the theoretical lense of the research, Stakeholder Theory. It is acknowledged in Stakeholder Theory that satisfying all related stakeholders, even the indirect customers. When business/firms in the private sector make efforts to satisfy indirect stakeholders (CSR programmes, collaborate with local businesses, collaborate with domestic shipping lines, etc in Section 6.1.4), they are inevitably making sacrifices to profitability in the short term and hoping to get benefits for the long-term. This might lead to having more private sector involvement in secondary hub ports, not only in main hubs.

For example, domestic and international shipping lines coming in to more peripheral locations aims to become first mover and get the long-term benefits when cargo volume increases in that particular location/region. By helping the peripheral region, they are in the same time creating 'trickle-down' effects, a terminology used in the Economics. They are actually making the peripheral location to escape from the peripherality cycle in an upward direction (Section 4.2.1). If they could manage their financial position while doing these investments in a CSR setting, cargo volume eventually increases, and they get the profitability back in return. On the contrary, international port operators in Indonesia's case are unwilling to invest in potential secondary hub ports because they do not see any profitable return in the long-term for them. They are consistent to keep their business location in existing main hubs which are at the top of Indonesia's port hierarchy. Further question to be asked is how long or how far are stakeholders fom private sectors willing to continue their investsments in more peripheral locations if the efforts to escape from the peripherality cycle is unsuccessful (see Section 4.2.1). This could be an interesting topic in the peripheral port literature for the future.

Stakeholder perception and behaviour are one of the focus of the Thesis. The use of mixed methods in Chapter 5 (identifying concentration-deconcentration factors) enables the addition of survey item questions from interview results. Moreover, in this current Chapter to answer the last research question (research question-4 on stakeholders' willingness to invest), it is

shown that Survey-Mixed Methods research strategy has been appropriate. Qualitative interviews and quantitative survey enable the comparison and cross-check of 'willingness' from qualitative interviews (codings in Section 6.1.3, decision tree in Section 6.3.1) with quantitative survey (post-hoc analysis in Section 6.2.3).

6.3.3 Empowerment of Local Government and Local Businesses

It is understood from the literature that peripherality could be an aspatial, governance and development issue, not only related to geographical issues (Section 2.1.1 and Section 2.1.2). Literature on port governance, such as the WORKPORT model and the World Bank Port ownership model (see Figure 2.13 in Section 2.2.2), shows a trend that more private sector is coming in ports.

Contrasting findings are found in this study. Comparison of port ownerships in peripheral ports from literature and results of this Thesis is shown in Table 6.8. The case studies in Canada and France shows that the central government are gradually transferring their small ports to the lower-tier government, having decentralisation or devolution, so that they could download' financial responsibilities and reduce expenditures (Debrie et al. 2007), as explained in Section 2.1.3.

In Japan, the management and planning of small peripheral ports are entrusted to local government or local authorities, and currently port operations are starting to be entrusted to private companies Shinohara and Saika (2018). In Small Island Developing States (SIDS), particularly in the Caribbean and the Pacific nations, private sector such as shipping lines are the stakeholders interested to enter peripheral locations. They select locations with the largest population or cargo volume as their transhipment hub for that region, while those ports not selected remain small feeders (Dunbar-Nobes 1984; UNCTAD 2014; Wiradanti et al. 2018).

Meanwhile in Indonesia, the central government, port operators and shipping lines are demonstrating their willingness and investments in more peripheral locations. Moreover, private sector is found more willing than local government itself (Section 6.1.3 and Section 6.2.3). Since local government and local businesses are also perceived the most relevant parties in the development of peripheral ports (Figure 6.7 in Section 6.1.4). Hence, further strategy to create suitable conditions or environment to support the private sectors who are already willing to invest is by the empowerment of local government and local businesses (or local cargo owners, local shippers).

Table 6.8 Comparison of Port Ownerships from Literature and Results of the Thesis

Case	Government Policy and Port Hierarchy	Stakeholders' Interested*	Source
Canada	• 30 remote ports in state control. • 540 remaining ports to be transferred over a 10-year period • 19 largest ports devolved in not-for-profit local authorities	Public actors from lower tier government are interested.	Debrie et al. (2007)
France	• 7 remote ports in state control. • 12 ports devolution offered to any public authority (regional, departmental, urban agglomeration or town).	If there are no private sector interested, then the ports are automatically transferred to the region.	Debrie et al. (2007)
Japan	• Small peripheral ports in Japan are managed and entrusted to local governments or local authorities. • The Japanese central government does not have intention to change this structure.	The operation of ports is being entrusted to privately managed corporations and local authorities try to maintain their control.	Shinohara and Saika (2018)
The Caribbean and The Pacific States	• Small peripheral ports are owned and managed by their government. • SIDS are geographically archipelagos, and having many different governments involved in a region, hence, it is complex to have coordination in the region.	Shipping lines select particular ports to become transhipment hub in the region are growing while ports not selected remain small feeders.	Dunbar-Nobes (1984); UNCTAD (2014); Wiradanti et al. (2018)
Indonesia	State-owned port operators are allowed to expand their business in more peripheral locations, and not only in their authorised location (Figure 1.9, explained in Section 1.5.2). Private sectors are also allowed to enter as written in Regulation no.17year 2008.	Besides state-owned port operators, private sector are more willing than local government, such as from domestic and international shipping lines.	This Thesis

Source: Author, (*) interested to participate in decentralisation or devolution

The aspatial issue found on peripherality in Indonesia's context are concerning political and human capacity issue (Section 4.2.3). Local government are also expected to initiate development. As an example, a respondent from the central government expects that the local government supports the development in their area. He stated that, *"sea-side facilities are provided by central government, while the land-side facilities should be provided by the local government" (CG_6).* However, interview and survey results from local government indicates that they lack power and capacity. Not only power in terms of financial strength, they also need improvements in the quality of human resources (Section 4.1.1). They need to be more equipped with marketing skills to be able to sell and market their local products. Since there are signs of shipping lines, especially domestic ones, attracted to expand business to more peripheral locations, this opportunity should be welcomed by preparing better human resources in the local government and local business players.

This again relates to consistency of the research findings with stakeholder theory. Shipping lines and port operators are willing to expand their business to capture the Eastern region as a

bigger market. If they could improve the market as “bigger cake”, hence, they can get larger slices of cake in the business competition. Indirect stakeholders to be approached by them are these local government and local businesses. CSR programmes, collaboration in short term operations or long-term planning could be an alternative way for empowerment.

Findings and discussion from Indonesia’s case, particularly on willingness to invest, could be applicable to other developing-archipelago countries. These lessons are beneficial in providing guidelines for ports in emerging economies in the development of their ports in order to increase connectivity, especially for more peripheral locations. However, generalisations from this Thesis should still be completed with other considerations such as specific and unique features of that particular country or region.

6.4 Conclusion

A mixed approach is adopted, qualitative by interviews and quantitative by survey, to identify the stakeholders’ willingness to invest in peripheral ports and peripheral locations (research question-4). In this chapter, findings from main interviews are the identification of stakeholders’ business location, their perception on importance of peripheral locations, willingness to invest, perception of stakeholder roles, enablers and barriers. Meanwhile, findings from the survey are indications that stakeholders are more willing to invest if they get a long-term benefit, instead of short-term advantages. It is also discussed to confirm which are aligned with literature in Chapter 2, and which are unique contributions of the Thesis. Overall, findings and discussions in this chapter argues the following three points.

First, is that there is a pattern identified for stakeholders’ willingness to invest and it can be represented in a decision tree diagram. It explains reasons and decisions behind stakeholders’ business location, perception on the importance of peripheral locations and willingness to invest into 4 main aspects: 1) ownership; 2) business location (customer, supplier, raw material); 3) financial conditions; 4) specific goals (e.g. to conduct Corporate Social Responsibility, support the government, improve human capacity, etc.). Second, it is identified that division of task between the government and private sector, also empowerment of local government and local businesses are needed to break out of the peripherality cycle identified in Chapter 4 and to enhance the deconcentration factors found in Chapter 5. Lastly, is that stakeholder theory fits well with the research findings because stakeholders who are willing to invest in more peripheral locations and aims to satisfy indirect stakeholders are motivated to get long-term benefit or sacrifice short-term loss in profitability.

Chapter 7
Conclusions

"There must be a beginning of any great matter, but the continuing into the end until it be thoroughly finished yields the true glory" (Sir Francis Drake – British Explorer)

7.1 Research Questions and Answers

Literature in Port and Maritime Economics domain is studied, particularly related to peripheral ports (Section 2.1) and container hub ports (Section 2.2). Literature on peripheral ports includes various definitions of peripherality and peripheral ports, disadvantage and advantage of being peripheral, development of peripheral ports, transport development models and port hierarchy, peripheral port challenge and the rise of secondary hub ports. Meanwhile, related to container hub ports, it has been explained the definitions of hub and hub ports, classification of hub ports, transhipment operations conducted in hub ports and the maritime network which shows the link between ports and shipping lines. Furthermore, it has been explained the concept of stakeholders in maritime economics, willingness, and willingness to invest (Section 2.3). The overall literature suggests that port traffic follows a trend of concentration and deconcentration, small-peripheral ports are challenging the large hubs, and there are reasons or factors which explaines why certain ports are selected or not selected as port of call.

The literature is then aligned with the situation in Indonesia's port and maritime industry (Section 1.5). They are making efforts to have more deconcentration of traffic to the eastern part of the country, to generate economic growth (see Preliminary Interviews in Appendix 2). Development plan of a hub port in Eastern Indonesia is questioned to be able to work. Therefore, the main purpose of this research is to explore how a container hub port in a peripheral location could capture opportunities of growth, or in other words to identify factors for a peripheral port to reduce its peripherality by becoming a hub. Indonesia is also a suitable context for the research topic because is it a developing country with one of the longest coast lines, a significant number of small container ports, and located in South East Asia region affected by rapid growth as a result of 'China effect' (Appendix 1).

Four research questions are determined from the literature gap and research context. A pragmatism worldview/philosophical position is chosen. A survey strategy with mixed

methods methodology is conducted. It uses a qualitative (i.e. interviews) then quantitative sequence (i.e. survey and Exploratory Factor Analysis) to enable exploratory purposes in the beginning and followed by confirmatory purposes (Section 3.1). The unit of analysis is the Indonesian maritime transport system in a national level. Stakeholder Theory is used as theoretical lens. The following are a summary of the research questions and its answers.

RQ1: What is peripherality in the context of maritime economics?

In Indonesia's maritime transport sector, results show that peripherality is a cycle. Peripheral locations with low cargo volume lead to low shipping connections, low port performance and infrastructure, low economic activities, low population and political power, and returns to low cargo volume. Strategies to break out of the cycle are as follows: cargo volume needs to be generated; new market and routes opened as direct services or hub dependence shifted to emerging secondary hubs; and economic activities to be increased.

Peripherality is also an aspatial issue, with political and human capacity issues. These issues hinder the strategies to break out of peripherality cycle. For archipelagic countries like Indonesia, port hierarchy mapping is needed. The development of Indonesia's maritime transport system is aligned with classical transport development models and path dependency concept. This happens in a long period of time following the speed of trade and economic growth. Hence, to speed up the process, all related stakeholders should understand their role and collaborate to break out of the peripherality cycle.

a) *Are there certain levels or degrees of peripherality?*

   As the research progresses, findings from the main interviews has shown that identifying further levels in the peripherality concept is unnecessary. Ports in peripheral locations are identified to have similar characteristics. Instead, these characteristics could be seen as a cycle in a bigger picture.

b) *What are considered as potential peripheral ports?*

   A potential peripheral port, which is mentioned in the literature as a 'rising secondary hub', is not only able to attract shipping lines to make a direct service. It is also able to make its surrounding feeder connections to 'shift' to them from previous long term established dependent hub. Since levels of peripherality is not relevant anymore and peripherality is seen as a cycle, hence potential peripheral ports are the ones able to break out of the peripherality cycle or go up the upward spiral in the cycle.

c) *What are potential benefits of peripheral ports?*

In literature, peripheral ports are acknowldeged to bring economic growth for its direct region or hinterland. Moreover, findings suggest that peripheral ports are important to support the establishment of emerging secondary hub. 'Formalising' the feeder ports by upgrading their port facilities, improving productivity, generating continuous cargo volume, more preferably export cargoes, and establishing direct service with shipping lines are needed. Hence, the best peripheral port could move up the hierarchy and mapping port hierarchy should be conducted regularly in medium or long-term national planning.

d) *Who are the main stakeholders in peripheral port development?*

Main stakeholders identified to become respondents of the research are port operators, shipping lines, cargo owners, logistics companies, central government, local government, and funding institutions. Further findings from main interviews suggested more detailed stakeholders in the development of peripheral ports are local government, local industries, central government, Ministry of Transport, Pelindo (state-owned port operators) and shipping lines.

RQ2: What are the underlying concentration and deconcentration factors for developing a successful hub port in a peripheral location?

This question needs to be refined, since it is more logical and simpler to view them in one way which is to create deconcentration from existing large hubs to more peripheral ports.

a) *What are the concentration-deconcentration factors needed?*

There are 6 main themes identified from the literature which provides concepts, latent and item variables for the research, they are: Concentration Factors, Deconcentration Factors, Port Performance and Competitiveness Factors, Hub Location Factors, Port Selection Factors, Willingness.

After variable selection and main interview data are collected, these latent and item variables are then grouped into 7 latent variables, which are: Port Convenience (related to the peripheral port's convenience which could be controlled or improved in a long-term period of time), Port Tangible Aspects (related to the peripheral port's hard/physical infrastructure or facilities), Port Intangible Aspects (related to the peripheral port's soft operational and main service performance/efficiency), Port

Cluster and Environment (related to activities in the peripheral port's cluster and environment, surrounding the port which is not the main service of the port), Cargo (related to the peripheral port's cargo, throughput and types of cargo), Private Sector Involvement (related to private sector involvement in the peripheral port's ownership, operations and investments), Government Investment and Policy (related to private sector involvement in the peripheral port's ownership, operations, investments, planning and policy), and lastly Willingness to Invest.

After survey and Exploratory Factor Analysis, factors needed for a peripheral port to become a hub are simplified into three factors: Standardised port operations (Factor-1) represents 29 items; Clear policy, financed and governance (Factor-2) represents 15 items; Positive spatial aspects (Factor-3) represernts 22 items. There are a total of 66 item variables which represents these three factors.

b) What are the concentration-deconcentration factors in Indonesia's port development?

The items from each of the three factors perceived by respondents in Indonesia's maritime transport system are as follows:

- Standardised port operations (Factor-1):

Available sea routes; Low congestion; Customs integration; Natural depth; Safety and security; Port's reputation; Quay / berth length; Cranes; Container stacking yard; Availability of other handling equipment; Reliability of other handling equipment; Storage space, warehouse, liquid bulk tank; Overall port capacity; Standardised technical infrastructure; Continuous infrastructure upgrade; Overall port efficiency; Cargo handling efficiency; Low cargo damage; IT ability; Stability of port's labour; Good management and labour relations; 24/7 service; Communicative and responsive; Cargo tracking system; Overall quality of human resources; General road connecting the surrounding cities; Available land for port and logistics expansion; Container cargo volume; Mapping of cargo.

- Clear policy, financed and governance (Factor-2):

Foreign sector involvement; Sound investment system; Financial assistance for investing companies; Exclusive contracts policy for dedicated terminal; Strategy of international operators; Shipping alliance formation; Collaboration with shipping line; clear phases of investment (time and amount of investment); Involve in CSR programmes; Less monopoly; Gov policy to prioritise peripheral ports; Supported by

local and provincial government planning; Political stability; Less bureaucracy; Central gov coordination with others

- Positive spatial aspects (Factor-3):

Sea distance to hub ports; Less competition with other modes of transport; Less competition with shipping; Other value-added services (water, rubbish, bunkering); Waterway/river connecting the port; Relatively cheap land; Certain population metropolitan area; Certain surface metropolitan area; International forwarding agents; Relatively cheap labour cost; Special economic zone; Sufficient hinterland; Market power / economic activity of hinterland; Overlapping hinterland; Expansion of foreland; new local market; local fertile land; near tourism sites; new industrial sites; niche market / specialised cargo volume; high value cargo; low value cargo.

RQ3: What are the critical factors for each stakeholder?

a) What are the concentration-deconcentration factors for each stakeholder?

Factor-1 is perceived as the Most Important factor. This is then followed by Factor-2 and Factor-3. This sequence of importance shows how it is prioritised and applies for stakeholders from the port operators, shipping lines, cargo owners, logistics companies and central government. The remaining stakeholders (local government, funding institutions and others) perceive the three factors as having the same level of priority. Critical item variables for each stakeholder can be seen in Table 5.26 in Section 5.3.2.

b) How should transhipment services or other value-added services be provided?

Transhipment services and value-added services becomes less prioritised for a peripheral port to become a hub because findings show that standardised port operations (Factor-1) is the most critical. This means that for a peripheral port to upgrade itself in the port hierarchy as a hub, it first needs to have standardised tangible aspects or infrastructure and intangible aspects or efficiency. Critical facilities needed in peripheral ports are cranes, draft, berth and road transport links. Transhipment and added-value services as additional requirements are detailed in Positive spatial aspects (Factor-3) and is lastly prioritised.

Besides less prioritised, transhipment activities are also considered ineffective and cumbersome in Indonesia's context. Direct connections, generating new cargo and industries are more preferred by stakeholders. However, to be able to get the ports in

the eastern region more involved in domestic and international trade, mapping of port hierarchy is needed.

RQ4: What are stakeholders' willingness to invest in peripheral ports?

a) How important are peripheral port development for each stakeholder?

There is a pattern identified for stakeholders' willingness to invest and it can be represented in a decision tree diagram, where decisions are made based on 4 aspects as follows: 1) ownership; 2) business location (customer, supplier, raw material); 3) financial conditions; 4) specific goals (e.g. to conduct Corporate Social Responsibility, support the government, improve human capacity, etc.).

b) What are their willingness to invest in peripheral ports?

Stakeholders with the highest willingness to invest are the central government, shipping lines (international and domestic) and domestic port operators. Overall, stakeholders who are willing or have invested in peripheral ports or in more peripheral locations are those who has specific aims to satisfy indirect stakeholders are motivated to get long-term benefit or sacrifice short-term loss in profitability.

c) Which main stakeholder should be the coordinator or integrator in peripheral port development?

Government is considered appropriate as the coordinator. They should also be a clear division of task between the government and private sector, also empowerment of local government and local businesses are needed to break out of the peripherality cycle identified in Chapter 4 and to enhance the deconcentration factors found in Chapter 5.

7.2 Reflection on Mixed Methods

Mixed methods have been appropriate and useful in the Thesis. The qualitative interviews help to investigate in-depth the reasons behind stakeholders' perception and behaviour. The use of NVIVO qualitative data software is also useful because it eases the author to manage ideas and create queries of data. Meanwhile, the online questionnaire survey data colleciton is useful to confirm the interviews and to reduce social desirability bias. This is because online survey enables respondents to express their responses without seen by the researcher, and still be able to provide their unique answers when they fill in the blanks (X8.8). Hence, respondents could feel more confident and not pressured to give responses which makes them look 'good' and

'nice'. The challenges of mixed methods noticed by the author is the extensive amount of time spent for analysing qualitative interview data, which is almost reaching one year. Overall, the author acknowledges that if qualitative methods were not complemented by the quantitative methods, the research findings or the bigger picture could not be confirmed.

7.3 Contribution of the Thesis

Overall, the implications of the Thesis could contribute to two aspects. First is to theory/literature; second to policy and practice. First, on the contribution to theory/literature in Maritime Economics and Transport. The thesis contributes to research on peripheral ports, emerging economies and Indonesia which are still understudied. It contributes by bringing a wider range of stakeholders, because previous research are mostly only looking at the perspective of private sectors in the maritime transport industry without the perspective of central government, local government and funding institutions.

Furthermore, it contributes by viewing peripherality in maritime economics as a cycle, in which the elements of the cycle was actually found scattered in the literature. It highlights the importance of mapping the port hierarchy in archipelago countries. It contributes to understand what are the underlying factors for a peripheral port to become a hub. This is because the previous literature dominantly focuses on factors creating concentration-deconcentration and port selection factors perceived by shipping lines to decide in which large/main hub ports they would want to enter. Next, it contributes to identify stakeholders who are willing to invest in more peripheral locations and their pattern of behaviour in a decision tree. This is because the previous literature only identifies cases reflecting peripheral port challenge, without measuring who are more willing, who are unwilling and what motivates them.

Second, on the contribution to policy and practice. The thesis provides guidelines for governments and ports in developing countries or emerging economies in their efforts to upgrade their small-peripheral ports. Findings and discussion from Indonesia's case, particularly on willingness to invest, could be applicable to other developing-archipelago countries. These lessons are beneficial in providing guidelines for ports in emerging economies in the development of their ports in order to increase connectivity, especially for more peripheral locations. However, generalisations from this Thesis should still be completed with other considerations such as specific and unique features of that particular country or region.

Consequently, they could position themselves in a higher port hierarchy, become more attractive for larger vessels or international shipping lines, and more connected to international

trade. It contributes to the private sector, either shipping lines, cargo owners, logistics companies or funding institutions, by identifying strategies to gain long-term benefits for their company. This is by satisfying their indirect stakeholders, which could be the local government and local businesses/local shippers, eventhough they must sacrifice their profitability in the early stages.

Finally, it also contributes to guide collaboration between stakeholders and policy formulation because item variables prioritised by each stakeholder has been identified. Implications for the industry and policy is addressed to the research sponsor and to peripheral ports in developing countries all over the world.

7.4 Limitations of the Thesis

Limitations of this Thesis mostly relates with methodology in three points. Limitations are on the case study design, qualitative data collection and quantitative data collection. First on case study design, it is a single case study and difficult to be generalised to population. It is acknowledged that case studies aims to generalise to theory instead of generalising to populations (Bryman and Bell 2003, p.300; Yin 2009, p.14). This study has a unique and specific context, which is in an archipelago country, in an emerging economic context, with dominant government ownership in its ports. It has attempt to contribute to theory on peripheral ports, peripheral port challenge and hub ports. However, an alternative design with additional qualitative approach could be done. In this alternative design, more interviews are done to each stakeholder types after quantitative survey is conducted in order to confirm the survey results. Hence, if this study is replicated in another archipelago-emerging economy country using grounded theory, it should have similar results to this thesis.

Second on qualitative data collection. There are difficulties to manage bias in interviews, especially when asking participants their perception on the importance of peripheral locations and peripheral ports. Findings shows that they dominantly perceive it as important, especiallly important for equality and as a social issue. It is inevitable for them to show a behaviour that is accepted by society known as social desirability bias (see Table 3.32 in Section 3.3.4). Especially in the Indonesian culture, where personal and business norms and/or perception are difficult to be separated. Hence, this becomes an issue in data validity. However, since this is a case study, it is treated as unique insights can be useful to build up the theory and bring contribution to literature.

Third on survey as quantitative data collection. There are difficulties to collect survey data participants in a proportional sample size for each stakeholder types. Findings shows that participants are dominantly geographically located in the western part of Indonesia, and very less samples represents the local government. Local government tend to have closed nature and not used to collaborate with somebody outside their network. Efforts has been made such as using good timings, personalised messages and sending reminder messages (see Section 3.3.2). This has been dealt with descriptive analysis to understand the most critical item variable for each stakeholder since other statistical methods are unable to have statistical power to represent local government participants. Hence, this issue on the proportion of stakeholder types, with a larger sample size, hopefully could be improved in future research to achieve better findings from statistical analysis results.

7.5 Further Research

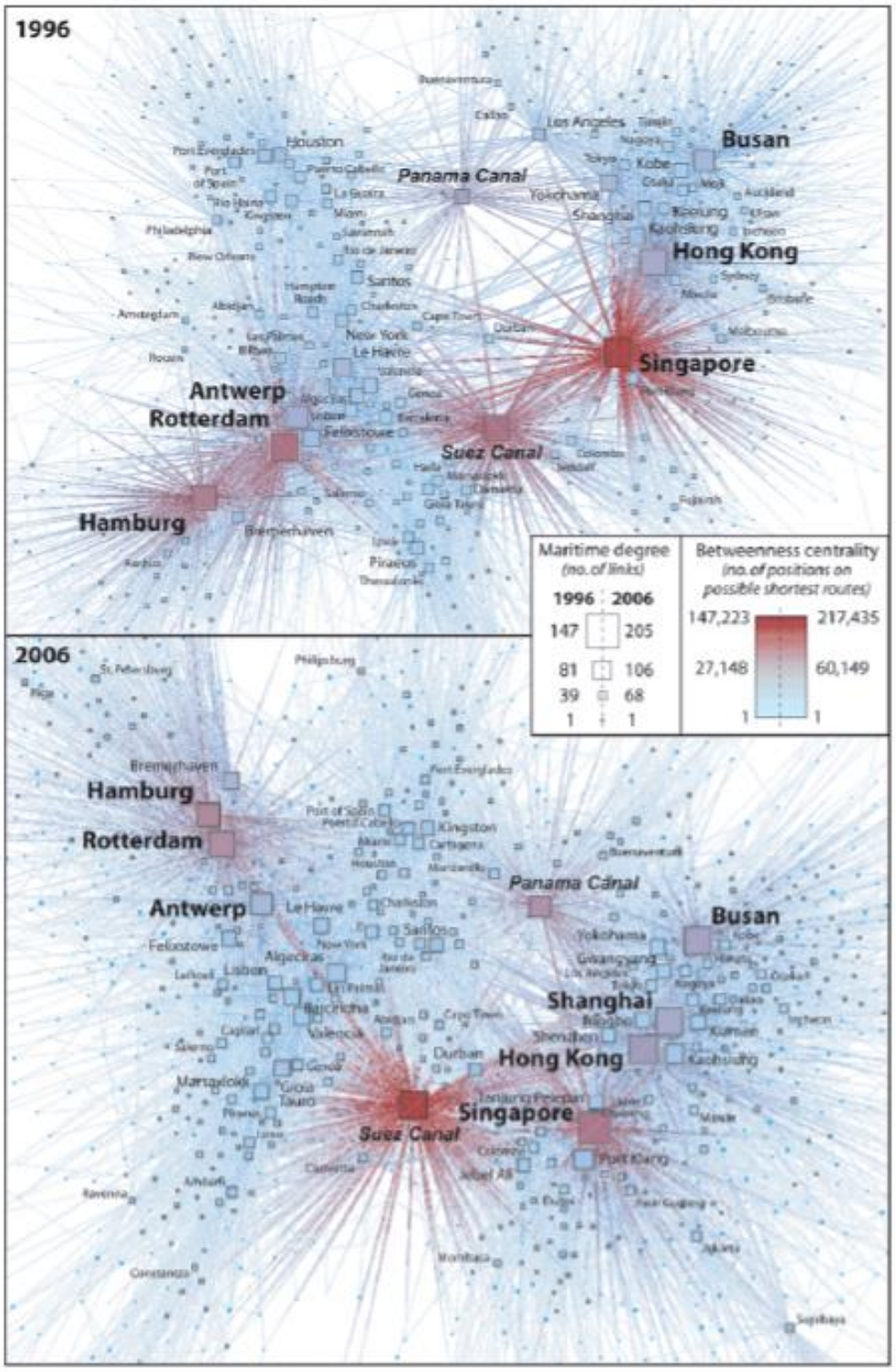
Besides improving the limitations of this Thesis, future research suggested are related to the research cargo scope, geographical scope, literature scope and research methodology. First on research cargo scope, this thesis does not specify which type of cargo to become the focus. Container cargo is the main object in large container hub ports. However, for peripheral ports, cargoes are various including bulk and general cargo. It could be studied in the future how specific types of cargo affects the port selection factor or concentration-deconcentration factors for peripheral ports. Second on the research geographical scope, this thesis looks at existing main hubs and peripheral ports in Indonesia. They are located facing inwardsof the country. It could be studied in the future how small-peripheral ports of the Indonesian islands that are facing outwards the country. This includes studying how they could attract cargo and create market to link with neighbouring countries such as Australia and global emerging economies such as India, South Africa and other South-South countries.

Third on literature scope, this thesis looks at literature in maritime economics and transport, also some related to economics, geography and development studies. It could be studied in the future other related fields such as marketing and business development should to better understand the complex behavior of players in maritime transport and able to improve marketing in peripheral ports. It is also interesting to investigate how far are stakeholders fom private sectors willing to continue their investsments in more peripheral locations if the efforts to escape from the peripheral cycle is unsuccessful.

Lastly on research methodology, a grounded theory approach or action research approach could be used as alternative ways to capture rich qualitative data and insights. This could benefit the researcher to further understand peripherality and peripheral ports in regions having very low cargo volume and population. It could also benefit to study how to create change/transformations and implementable steps for stakeholders in developing peripheral ports. Meanwhile, a more quantitative approach using port and shipping data throughput could benefit the researcher to further confirm port hierarchy and network connections in Indonesia's maritime transport and improve national planning and policy.

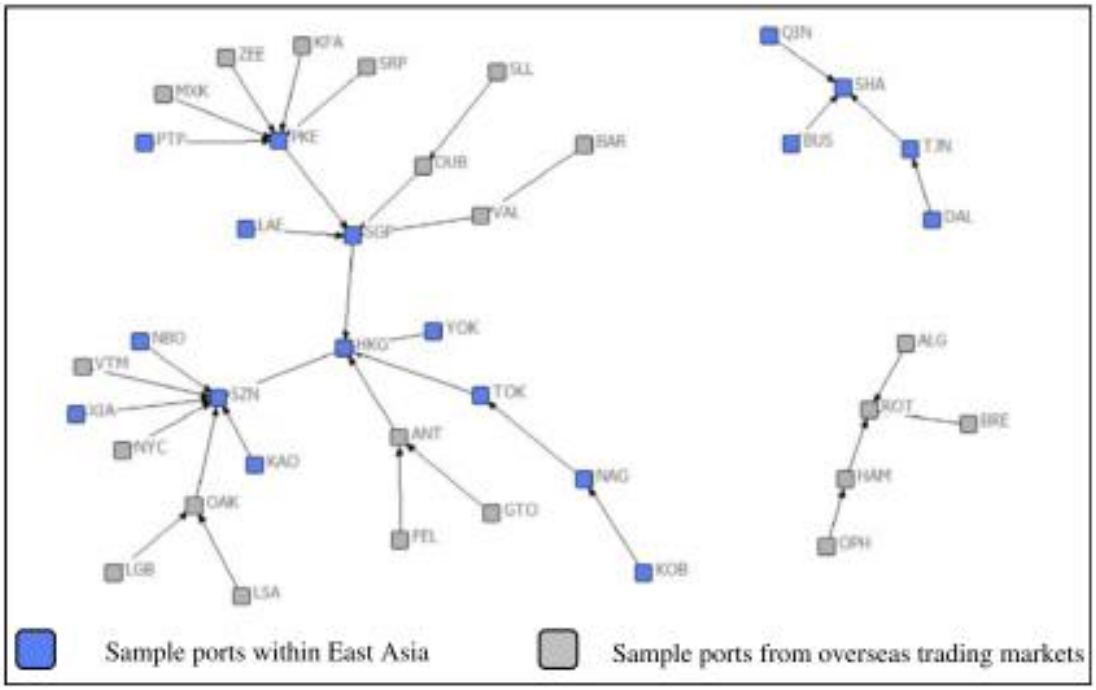
Appendix 1 Maritime Network, Global Trade and Emerging Economies

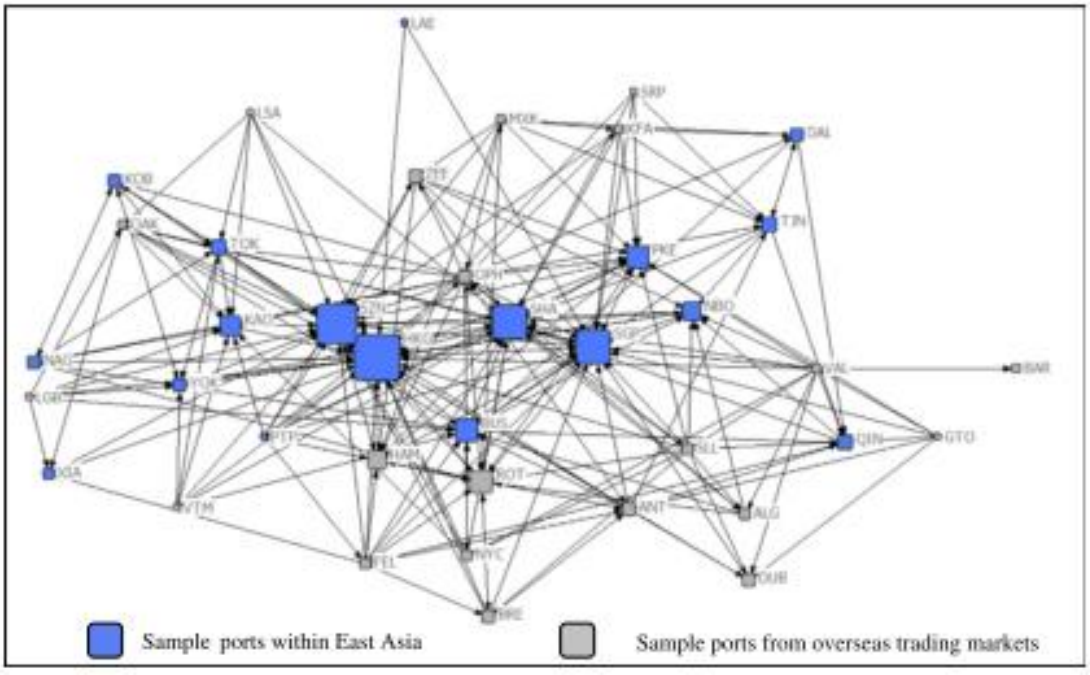
Studies on Maritime Network



Source: Ducruet and Notteboom (2012b, p.410)

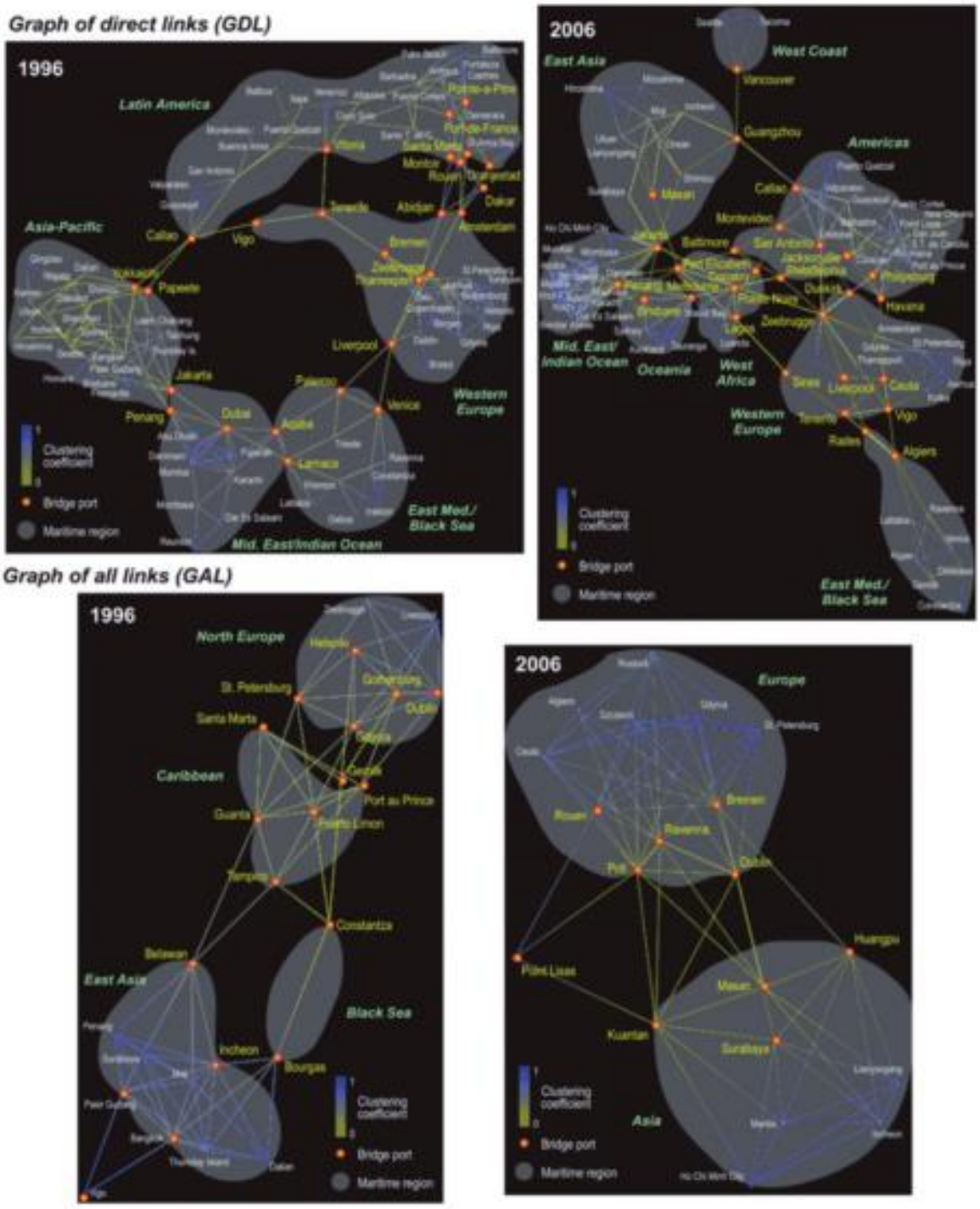
Appendix 1 - Figure 1 Global Maritime Network of Container Shipping by Ducruet and Notteboom (2012c)





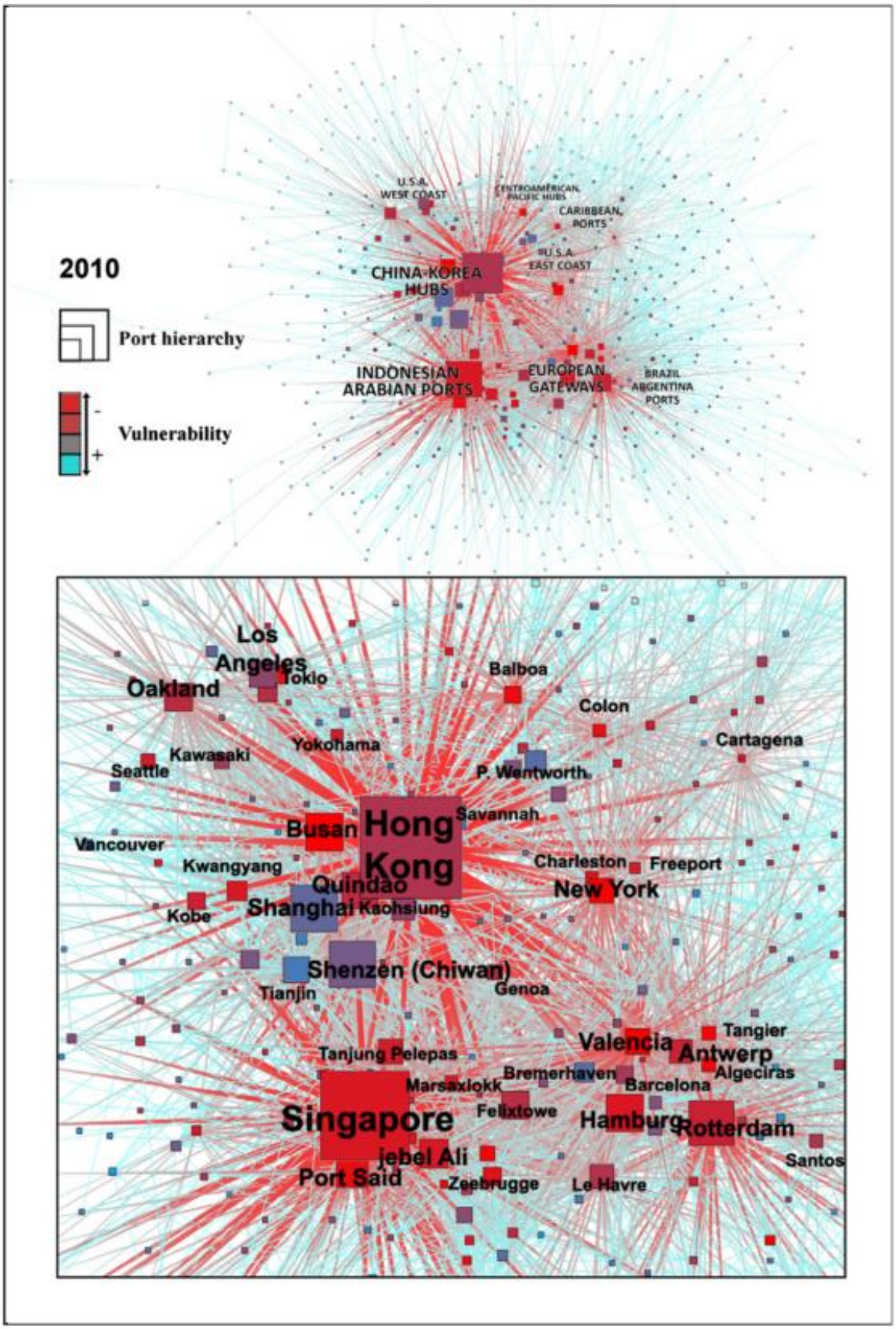
Source: Wang and Cullinane (2014, p.158)

Appendix 1 - Figure 2 Sample Network Configuration by Wang and Cullinane (2014)



Source: Ducruet and Zaidi (2012 p.163)

Appendix 1 - Figure 3 Bridges and Communities by Ducruet and Zaidi 2012



Source: Laxe et al. (2012, p. 40)

Appendix 1 - Figure 4 Separation structure using the centrality measure for 2010 by Laxe et al (2012)

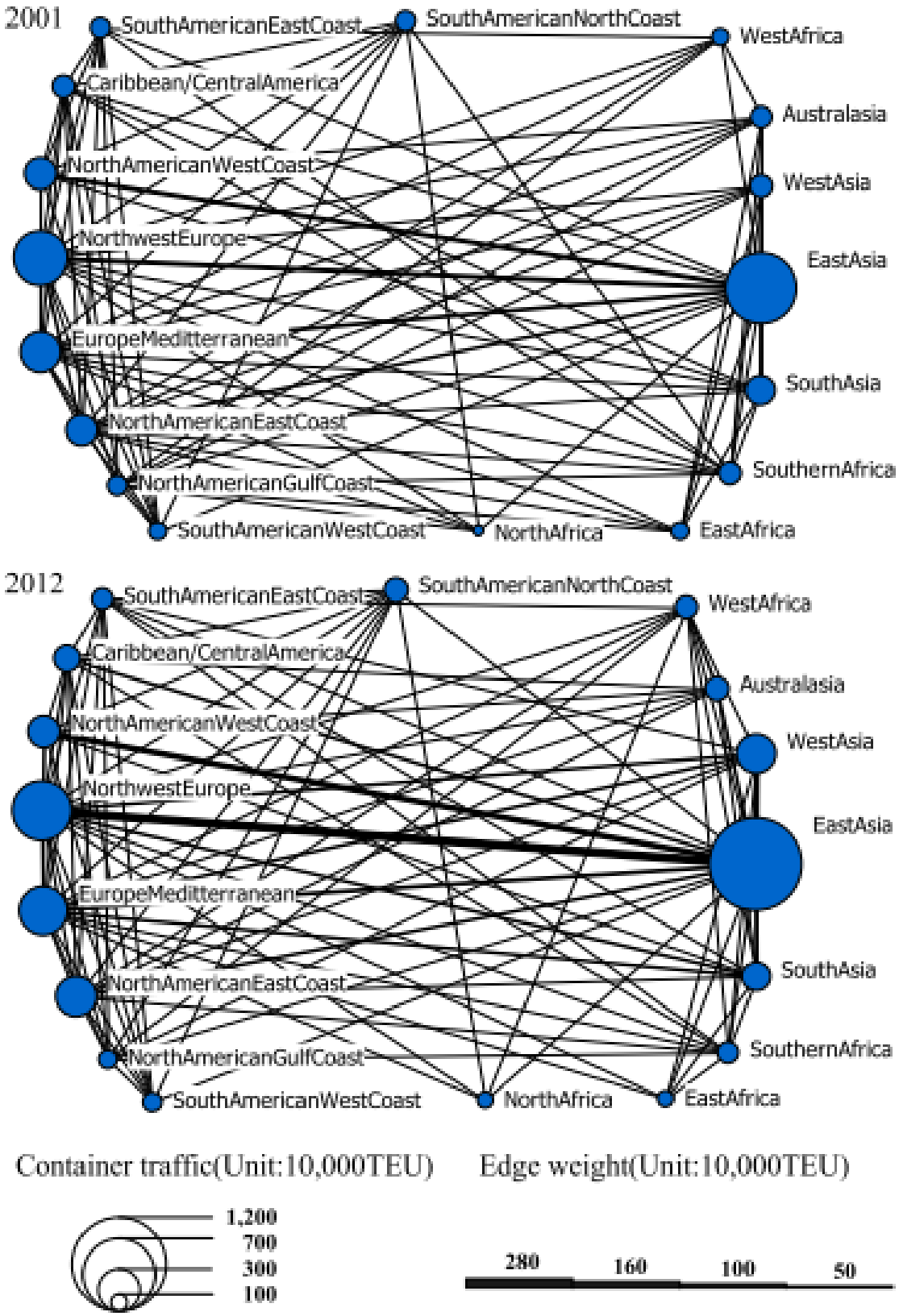


Fig. 2. Container traffic distribution among world regions in 2001 and 2012.

Source: Xu et al. (2015, p.5)

Appendix 1 - Figure 5 Container Traffic Distribution among World Regions in 2001 and 2012 by Xu et al (2015)

Changes in Global Trade

This section provides supporting information for the thesis on the object of the study as context. Understanding context is important because it drives the way for a researcher to understand the meaning of events (Mishler 1979 cited in Miles and Huberman 1994, p.102). Hence, in this section context is explained on the basic knowledge one must know about global trade, emerging economies, and how they are making efforts to capture opportunities for more economic growth by becoming container hub ports.

Commercial maritime trade centres of the world constantly change (Stopford 2009). Over the last 5,000 years these have shifted from east to west along a mysterious line. Stopford explaines that there is a deeply hidden economic force causing this, where it first starts in Mesopotamia in 3000 BC, to eastern Mediterranean, to Greece and Rome, to Venice in the next thousand of year, then to the European centres (Stopford 2009). This continued into the 19th century across the Atlantic, to North America and finally in the 20th century across the Pacific to Japan, South Korea, China and India (Stopford 2009). The line describing the shift is mentioned as 'The Westline', as seen in Figure 6.

Source: Stopford (2009, p.6)

Appendix 1 - Figure 6 Changes in Maritime Trading Centres

Inevitably, ships and ports also follow these changes of trade centre. Looking at the top 10 ranked world container ports in the last three decades (Table 1), it is logical to see that busy trade is reflected by busy container ports. In accordance with the timeline on 'The Westline', port of New York and Rotterdam was in the first and second largest container port in the world in 1980s (Containerisation International 1981). However, this changed in the 1990s with Asian ports eventually becoming more dominating.

Appendix 1 - Table 1 The World's Top 10 Container Ports from 1980 to 2014

Rank	1980	1984	1990	1995	2000	2005	2010	2014
1	New York	Rotterdam	Singapore	Hong Kong	Hong Kong	Singapore	Shanghai	Shanghai
2	Rotterdam	New York	Hong Kong	Singapore	Singapore	Hong Kong	Singapore	Singapore
3	Hong Kong	Hong Kong	Rotterdam	Los Angeles /Long Beach	Busan	Shanghai	Hong Kong	Shenzhen
4	Kobe	Kobe	Kaohsiung	Kaohsiung	Kaohsiung	Shenzhen	Shenzhen	Hong Kong
5	Kaohsiung	Kaohsiung	Kobe	Rotterdam	Rotterdam	Busan	Busan	Ningbo/Zhoushan
6	Singapore	Singapore	Busan	Tokyo /Yokohama	Shanghai	Kaohsiung	Los Angeles /Long Beach	Busan
7	San Juan	Antwerp	Los Angeles	Busan	Los Angeles	Rotterdam	Ningbo	Qingdao
8	Long Beach	Keelung	Hamburg	Hamburg	Long Beach	Hamburg	Guangzhou	Guangzhou
9	Hamburg	Yokohama	New York/ New Jersey	Kobe /Osaka	Hamburg	Dubai	Qingdao	Dubai
10	Oakland	Hamburg	Keelung	Seattle /Tacoma	Antwerp	Los Angeles	Dubai	Tianjin

Ports in Asia

Ports in China

Source: Author realised from Containerisation International (1981); Matthews (1985b); Containerisation International (1991); Fleming (1997); Shan et al. (2014); Containerisation International (2015)

The following are explanations on these main Asian ports. Since 1970s, Japan has actually dominated Asia's container trade taking the benefit of their industrialisation (Nam and Song 2011). Japanese port, Kobe, had position and an initial head start in containerisation among the other Asian ports, but since earthquake destruction in 1995 they could not maintain their previous position, experienced a long-term loss and over the last two decades have lost competitiveness (Fleming 1997; Chang 2000; Nam and Song 2011).

In the 1990s, Singapore and Hong Kong have been in the first and second position up to mid 2000s. It is not only because of luck that Hong Kong and Singapore were chosen by major container shipping lines as transhipment hubs or load centres (Fleming 1997). Historically, Singapore has been a port city with transhipment as their port's main activity since the 19th century (Tan 2007; UNESCAP 2007). It was the first port primarily dependent on transhipment cargoes (UNESCAP 2007). This transhipment is not only to transfer goods from a vessel to another vessel, but also includes re-packaging and re-distribution of imported and regional products to be re-exported to other destinations (Tan 2007). In 1990, Singapore for the first time overtake Hong Kong with 60% of its total throughput are from 'relay traffic' (Containerisation International 1991). The Port of Singapore Authority admitted that they took benefit from the increase in intra-Asia trade, resulting from high economic growth of countries in the South East and North East Asian (Containerisation International 1991).

Hong Kong came back to the first position in the mid-1990s. In 1995, about 70% of Hong Kong's total traffic either originated or ends up in China, because it connects the Pearl River delta and south Chinese hinterlands which generated a lot of traffic (Fleming 1997). Similar to Hong Kong, Lee and Rodrigue (2006) argued that Taiwan too experienced a 'China effect', with around 40% of traffic as transhipment (Fleming 1997).The opening of Shenzhen special economic zone (SEZ), with Hong Kong investments and Chinese labour resulted in Chinese goods to be transhipped to Hong Kong to compete in global markets (Lee and Rodrigue 2006). Meanwhile, investments and technological expertise from Taiwan came in to the Yangtze delta (Lee and Rodrigue 2006), together with the permit for foreign flag carriers to operate direct feeder service between Kaohsiung and mainland China, resulted in the rise of Kaohsiung's traffic (Fleming 1997).

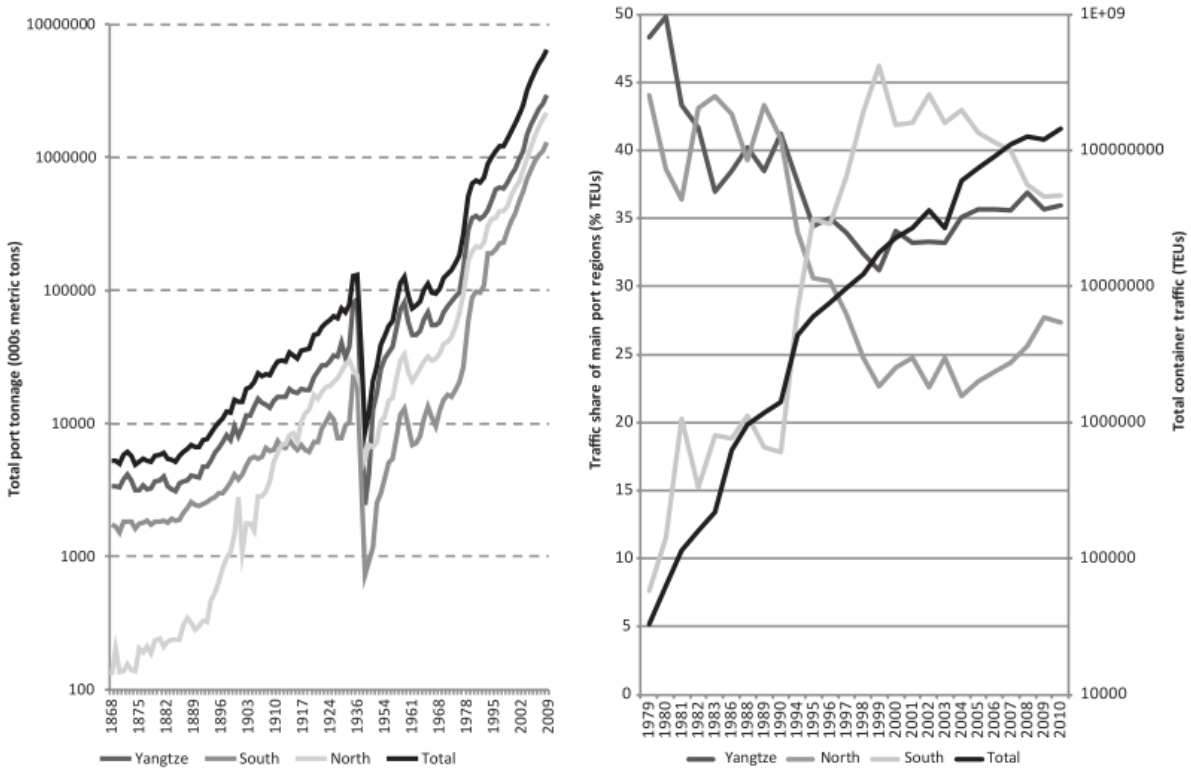
Besides Hong Kong, Singapore and Kaohsiung, there is also Busan among the top positions. South Korea's largest port, Busan, was preferred because of their country's economic growth (Fleming 1997) and located strategically in the main Trans-Pacific shipping route (Nam and

Song 2011). Not only having the whole South Korea as their hinterland, they also had around 20% of transhipment traffic in the mid-1990s, favoured by their two large container lines, Hanjin and Hyundai (Fleming 1997). The regional shipping network grew among Chinese ports in the Yellow Sea with South Korea and as containerisation increased, the Korea-China manufacturing supply chain increased with Busan still taking benefits (Lee and Rodrigue 2006).

Ports in China have been emerging since the late 1990s, with Shanghai as the largest (Shan et al. 2014). It is seen from Table 3.5 that China's container ports has the largest proportion in the top ranks today. China's manufacturing and competitive push in global trade causes reorientation to regional trade, with an increasing number of direct calls coming in to the Chinese ports (Lee and Rodrigue 2006; Ducruet et al. 2010). In 2012, Chinese ports handles up to 25-30% of the world's containers (Containerisation International 2012), and Asian ports handled approximately 70% of global container throughput (Heymann 2011). Moreover today, 21 out of 30 top container ports in the world in 2014 are Asian ports, which 11 of them are in China (Containerisation International 2015).

Within China itself port cargo has always been changing. Wang and Ducruet (2013) conducted a longitudinal study looking at China's port hierarchies since 221 BC during the First Unified Empire period to 2010. They devided 3 main regions which are Northern, Yangtze (Middle) and Southern region. At first growth started from river ports in the Northern part in 1890s, then Southern seaports which are dominated by international trading, then back to Northern seaports in early 1900s. Basically, concentration in the Northern ports are dominated by former colonisation by Russia and Japan who build industrial bases, transport infrastructure, also political factors (including its centre capital Beijing there), while Southern ports are dominated by dependent on foreign trade (Wang and Ducruet 2013). Traffic share in these main 3 regions are described in Figure 7 by Wang and Ducruet (2013, p.533).

Change is constant. Ship routing or maritime trading routes continues to change as many events around the world happens. The 'China Effect' could be seen in other parts of the world besides Asia itself. Australia experience reorientation of cargo from previously heavily dependent on Europe and North America into East Asia and ASEAN countries (Wu 2011). This triggers their plan to create Port of Darwin as transhipment and logistics hubs for the nation, which did not end successful. American continent also experience reorientation ss explained before concerning PPC, market share in the west coast ports of North America doubled while east coast decreased from 1997 to 2012 (Wilmsmeier et al. 2014).



Source: Wang and Ducruet (2013)

Appendix 1 - Figure 7 China's Traffic by Range

Changes in trade patterns could also be affected by infrastructure development in the hinterland, which is the area served by the port. Since the role of ports are changing, the definition of hinterland also changes. Notteboom and Rodrigue (2007) describes the common definition of hinterland as the area over which a port draws the majority of its business. They argued that hinterland should be recognised in three specific types to support the 'Global Commodity Chains' which are macro-economic hinterland, physical hinterland and logistical hinterland, explained as follows (Notteboom and Rodrigue 2007):

- Macro-economic hinterland: hinterland represented by the origin/destination and actors which has transport demands. It could be a set of production, consumption and distribution centres as a consequence of agglomeration and regional specialisation in a global setting. This relates with macro-economic issues such as interest rates, exchange rates, prices, savings, etc, within economic and financial geography.
- Physical hinterland: hinterland represented by the modal and intermodal infrastructure as the transport supply that connects the transport demand to the port.
- Logistical hinterland: hinterland represented by the organisation of flow to cope with the macro-economic and physical setting.

Notteboom and Rodrigue (2007) explained that macro-economic hinterland or trade patterns, could easily change but physical hinterland needs time to adapt or respond, especially on the inland infrastructures. Therefore, they suggested that the timespan between planning and realisation of infrastructure development should not be delayed too long because '*it could end up as an investment in the wrong place, at the wrong time, for the wrong market and using the wrong technology'* (Notteboom and Rodrigue 2007, p.11). Trade patterns should be identified, critically evaluated and considered in port planning. Every country including developing countries should realise that changes in world trade volume are not only increasing quantitatively, but it is also changing geographically.

Another example, despite increased cargo in west coast ports in the United States, higher freight charges and the expansion of Panama Canal is expected to create shifts from West coast back to East coast ports (Martinez et al. 2016). From their simulation study, Martinez et al. (2016) showed that significant transit time savings on shipments from Asia going through Panama Canal expansion could affect shipping's routing decision.

World's Largest Hub Ports

According to Ducruet and Notteboom (2012a), liner service network configurations are becoming more complex as seen from the number of container port handling per box. In 2008, a container on average was handled 3.5 times compared to 3 times in 1990, between the first port of loading until the last port of discharge (Ducruet and Notteboom 2012a). Worldwide container throughput increased up to 535 million TEU in 2008 compared to 88 million TEU in 1990 (Ducruet and Notteboom 2012a). The following Table 2 describes the world's largest container port by transhipment volume in 2003 and 2012.

Appendix 1 - Table 2 World's Largest Container Hub Ports by Transhipment Volume

2003			2012*)		
Port Name or Location	**Transhipment Estimate (million TEU)**	**Incidence (%)**	**Port Name or Location**	**Transhipment Estimate (million TEU)**	**Estimated Incidence (%)**
Singapore	14.8	81 %	Singapore	25.2	> 75%
Hong Kong	6.2	30 %	Hong Kong	14.3	50-75%
Shanghai	4.8	43 %	Shanghai	11.5	25-50%
Kaohsiung	4.5	52 %	Busan	7.4	25-50%
Busan	4.2	41 %	Tanjung Pelepas	7.1	> 75%
Tanjung Pelepas	3.3	96 %	Dubai	6.4	25-50%
Rotterdam	2.8	40 %	Guangzhou	6.3	25-50%
Dubai	2.6	51 %	Klang	6.0	50-75%
Gioia Tauro	2.4	80 %	Shenzhen	5.0	< 25%
Algeciras	2.1	84 %	Kaohsiung	4.5	25-50%

Source: Author, from Drewry-Shipping-Consultants (2005), *)Notteboom et al. (2014)

Table 2 also shows that transhipment volumes are dominantly in Asia. In 2003, transhipment done by European ports such as Rotterdam, Gioia Tauro and Aleciras are still in the top 10. However, in 2012, it is all dominated by Asian ports with Singapore and Tanjung Pelepas having more than 75% transhipment incidence. Cullinane and Wang (2012) clustered East Asia ports into 3 level of hierarchy using 2009 cargo flow data to understand their different characteristics. It shows that ports in level-1 are ports that are always called at least once by shipping lines going through East Asia. These ports are Singapore, Shanghai, Hong Kong and Shenzhen. Ports in level-2 are ports having particular influence to particular markets. These ports are Busan and Kaohsiung which attract shipping connections to North American market, also Port Kelang which attract Europe, Mediteranean and Middle East market. Last are ports in level-3 which has a shared hinterland in Asia and fewer connections to international market, those are: Qingdao, Tianjin, Tanjung Pelepas, Xiamen, Laem Chabang, Dalian, Tokyo, Yokohama, Kobe, Nagoya (Cullinane and Wang 2012, p.178).

Emerging Economies and Opportunities in Becoming Container Hub Ports

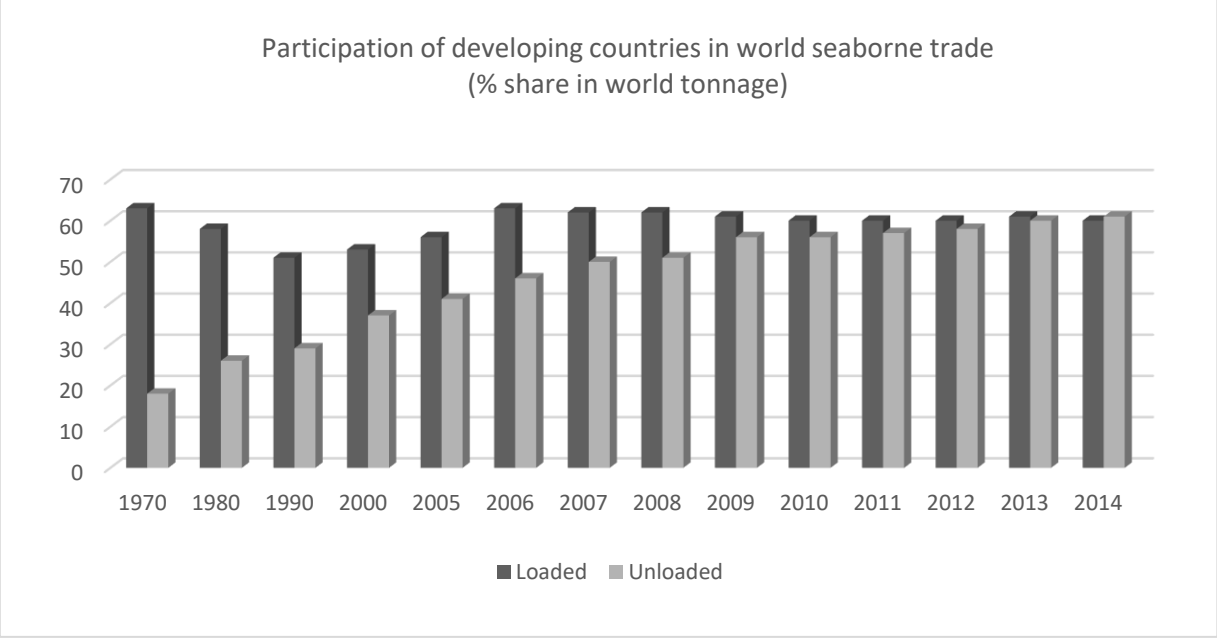
Globalisation has created a more complex way of trade, manufacturing and maritime transport. Globalisation can be defined as '*increased connections and linkages between people and firms located in different places, manifested in flows of goods, services, money, information and people across national and continental borders'* (MacKinnon and Cumbers 2011). One of the benefit from globalisation is the existence of global sourcing, as a worldwide integration of engineering, operations, logistics, procurement, and marketing within the upstream portion of a firm's supply chain (Trent and Monczka 2003). It is different with international buying, since it has a wider scope and more complexity, where the companies practising them are more proactive to integrate and coordinate with their suppliers (Trent and Monczka 2003).

Potential destination countries for global sourcing are developing countries or also known as emerging markets. They provide cheaper labour, supply raw materials, play a part in manufacturing processes, and also attractive in providing business expansion opportunities because of their increasing domestic consumption (Manners-Bell et al. 2014; UNCTAD 2015). Emerging economies are also attractive to save cost save from fewer regulatory controls (Christopher et al. 2006). The term 'emerging markets' itself originally came from the World Bank's International Finance Corporation (IFC) in 1981, which means specific countries in World Bank's category of low or middle income economy that are making efforts to improve their economy, located and/or having investable market capitalization relatively lower than its recent Gross Domestic Product (GDP) (Manners-Bell et al. 2014, p.4).

In 2001, Jim O'Neill - a former Goldman Sachs economist- predicted the economic rise of Brazil, Russia, India and China as the BRIC countries (Cocks 2014). Later on he identified the next 'emerging economic giants' Mexico, Indonesia, Nigeria and Turkey as the MINT countries (BBC 2014). They take benefit of their strategic geographical position, which is connected with the changing patterns of world trade (BBC 2014). A research between 1995 to 2005 showed that total exported products more than quadrupled from BRIC producers and almost tripled from MINT countries (Husted and Shuichiro 2014). MINT is also identified as one of the alternative solution to global crisis' challenges (Ionescu 2014).

Besides the BRIC and MINT, other countries with abbreviations known as emerging markets today are South Africa (adding to BRICS); Columbia, Indonesia, Vietnam, Egypt, Turkey and South Africa (CIVETS); Bangladesh, Egypt, Indonesia, Iran, Mexico, Nigeria, Pakistan, Philippines, South Africa, Turkey and Vietnam (Next 11); and 'Emerging and Growth Leading Economies' which are Brazil, China, Egypt, India, Indonesia, South Korea, Mexico, Russia, Taiwan, and Turkey (EAGLES) (Manners-Bell et al. 2014).

As trade with developing economies continues to grow, transportation links with them become more important. Over the last three decades, global goods loaded from developing countries are above 50%, while goods unloaded keeps growing from 18% in 1970 up to 61% in 2014 (UNCTAD 2015). It continues to contribute to international seaborne trade and create demand for maritime transport services as described in Figure 8.



Source: UNCTAD (2015, p.12)

Appendix 1 - Figure 8 Participation of Developing Countries in World Seaborne Trade in selected years

Comparing year 1970 and 2014, it is seen that developing countries not only export raw materials, they also import raw materials, participate in production and export the manufactured goods hence higher unloading percentage (Sitorus 2015). Having emerging countries as part of the extended supply chain also has a downside. The delivery cycle time increases because of longer distance (Trent and Monczka 2003; Manners-Bell et al. 2014). Moreover, it has risks as follows:

> *'Less agile response to market conditions, more handoffs between parties, challenges in ensuring quality control, exposure to currency fluctuations, labour disputes, shipping costs, corruption, thefts, natural disasters and geo-political instability' (Manners-Bell et al. 2014, p.7).*

Besides improving their transport facilities, emerging economies are also developing their ports. Studies describes that emerging economies are putting effort to capture more opportunities from becoming hub in their region as seen in Table 3. These studies in Table 3 describe how these emerging economies are not only pursuing and facilitating more trade, but also trying to survive in port competition. The East Mediterranean region is strategically located and competition is tough for Turkish ports such as with Greek ports Piraeus and Thessaloniki, Bulgaria's port of Varna, Romania's port of Costanza, (Lowry 2011, 2012), also with Italy's Gioia Tauro port and Spain's Algeciras port in the Western Mediterranean, which has become Mediterranean Sea's important hub port (Oral et al. 2007).

Likewise in Southeast Asia. In his research, Talib (2008) tries to identify the potential of Muara Container Terminal (MCT) in Brunei Darussalam to become transhipment hub for Brunei-Indonesia-Malaysia-Phillipines East ASEAN Growth Area (BIMP EAGA). His analysis is based on descriptive and regression of secondary data on port indicators to estimate port throughput. These indicators are waiting times in port, berth occupancy rate, port time and service time (Talib 2008). The results show that, though operated by PSA and equipped with modern facilities, MCT is inefficient because capacity utilisation is low, with its main competitor are Port of Bintulu port (Malaysia) and Davao port (Phillippines).

The research by Talib (2008) lacks information since the preference of shipping lines or shippers are not explored in the particular regional competition. On the other hand, the study by Reza et al. (2015) shows that the most significant aspect for Southeast Asian countries to increase its liner shipping connectivity index (LSCI) is the port's capacity to accept larger ship size. With panel data analysis and descriptive statistics, the study grouped ASEAN countries into ASEAN-

2 (Singapore and Malaysia) and ASEAN-4 (Indonesia, Phillipines, Thailand and Vietnam). They recommended in general that infrastructure upgrade is critical and that these two groups should prioritise in different aspects of the infrastructure and port service, as seen in Table 4.

Appendix 1 - Table 3 Studies on Ports of Developing Countries' Efforts to become Regional Hubs

Region	No	Country	Source
America	1	Mexico's ports Lazaro Cardenas and Manzanillo becoming alternatives to the congested West Coast ports of United States	Peyrelongue (2002); Osler (2004); Nelson (2005, 2006, 2008)
	2	Uruguay and its neighbouring countries in Southeast of America	Wilmsmeier et al. (2010)
	3	Kingston (Jamaica) as transhipment hub in the Caribbean because of its centrality & intermediacy.	McCalla (2008)
Asia	1	Turkey as hub in the Eastern Mediterranean region	Oral et al. (2007); Lowry (2011); Bloem et al. (2013)
	2	Asia pacific countries with increasing transhipment activities such as Colombo (Sri Lanka), Salalah (Oman), Aden (Yemen), Tanjung Pelepas (Malaysia) and Gwangyang (South Korea)	UNESCAP (2007)
	3	Countries in the East of Southeast Asia competing to become hub, they are Brunei, Indonesia, Malaysia, and Philippines (BIMP)	Talib (2008); Reza et al. (2015)
Africa	1	Countries in Western Africa competing to become hub	Van Dyck (2015),
	2	The changing position of South Africa in the global network	Fraser and Notteboom (2014); Fraser et al. (2016)
	3	Attractiveness of Ports in West Africa	Gohomene et al. (2016)

Source: Author

Appendix 1 - Table 4 Recommendations for Southeast Asian ports to improve LSCI by Reza et al. (2015)

To improve LSCI score	ASEAN-2	ASEAN-4
1st priority	Services	Ship Size
2nd priority	Ship size (+ supporting infrastructure)	Improve liner TEU capacity
3rd priority	Improve liner TEU capacity	Attract new companies

Source: Reza et al. (2015, p.69)

Appendix 1 - Table 5 Top 10 Developing Countries based on Container Port Throughput in 2012 to 2014

Rank	Country/Territory	Port Throughput			Percentage Change	
		2012	2013	2014	2013-2012	2014-2013
1	China	161,318,524	170,858,775	181,635,245	5.91	6.31
2	**Singapore**	**32,498,652**	**33,516,343**	**34,832,376**	**3.13**	**3.93**
3	Republic of Korea	21,609,746	22,588,400	23,796,846	4.53	5.35
4	**Malaysia**	**20,873,479**	**21,168,981**	**22,718,784**	**1.42**	**7.32**
5	Hong Kong (China)	23,117,000	22,352,000	22,300,000	-3.31	-0.23
6	United Arab Emirates	18,120,915	19,336,427	20,900,567	6.71	8.09
7	Taiwan	14,976,356	15,353,404	16,430,542	2.52	7.02
8	**Indonesia**	**9,638,607**	**11,273,450**	**11,900,763**	**16.96**	**5.56**
9	India	10,279,265	10,883,343	11,655,635	5.88	7.10
10	Brazil	9,322,769	10,176,613	10,678,564	9.16	4.93
	Northeast Asia					
	Southeast Asia					

Source: UNCTAD (2015, p.67)

Appendix 2 Preliminary Inteviews

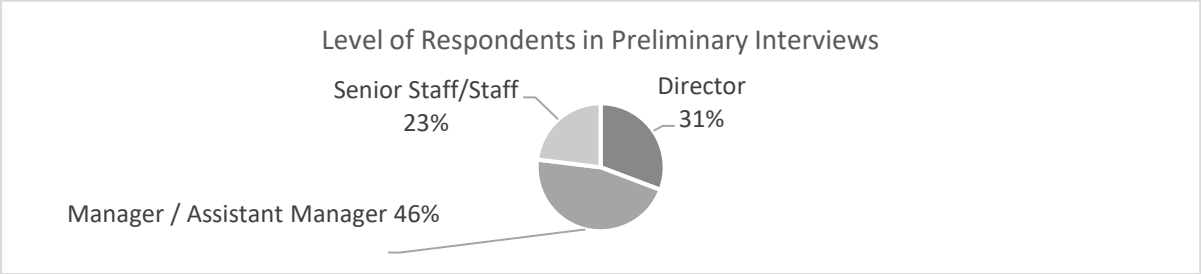
Purpose

Preliminary interviews were conducted in an exploratory study as the first data collection of the thesis, which is used to contextualise the main data collection. The purpose was to explore the historical background, current status and future plans for the development of peripheral ports in Indonesia. Therefore, those were the main questions asked. Interviews were conducted with 13 respondents who are employees in a port operating company in Indonesia, in April – May 2015. Respondents were chosen by purposive sampling, which is in the author's professional network, because their position or work is related with peripheral port development. Their position in the company ranged from senior staff up to Director level. Interviews to Human Resource directorate was informal and not recorded. The list of respondents and questions are described in Table 1 while different level of respondents are shown in Figure 1.

Appendix 2 - Table 1 Protocol in Preliminary Interviews

Respondents	Questions
Relevant Divisions - Strategic Planning (6 respondents) - Port Development Subsidiary company (3 respondents)	**General Questions:** 1) What is the historical background for the development of peripheral ports in Indonesia? 2) How is the current status of the development? 3) What are the difficulties in the development? 4) What are the future plans?
Gatekeepers	**Specific Questions:**
- Corporate Secretary (1 respondent)	1) How has the development of peripheral ports been disclosed/explained to public? 2) How can I arrange interviews with the Directors, related subsidiary companies, customers and related government officers?
- Human Resource (informal interview)	1) How is the human resource allocated for the development of peripheral ports? 2) How can I arrange an interview with the Directors, related subsidiary companies, customers and related government officer?
- Port Customer Relation / Marketing (3 respondents)	1) How can I get access and contacts to the port's customers such as shipping lines, shippers, freight forwarder for main data collection?

Source: Author



Source: Author

Appendix 2 - Figure 1 Level of Respondents in Preliminary Interviews

There were ethical considerations for these preliminary interviews, which are related to the respondent company and individual participants. Ethical consideration for main data collection of the Thesis is explained further separately in Section 3.1.8. First related to the company, political problems in the company should not be disclosed. Second related to respondents, they are informed about the interview and the questions before by email and personal messaging. Participation in the study was entirely voluntary, it was explained to participants that they could withdraw from the study at any time without giving a reason and the company's approval in this study did not oblige respondents to participate in the study. They had the right not to answer or say "no comment" to any questions during the session. Participation is not linked in any way with job performance, nor will the researcher share the names of participants with the company. Audio-recording was done only when it is approved by the participants and the transcripts are available for them. Data and transcripts are safely kept by the author.

Overall Findings

Preliminary interviews supported the determination of the scope of study. It also helped determine the most appropriate stakeholders for the main data collection of the thesis. Furter it helpd the author to get contacts and access potential respondents for main data collection in the next phases. Overall, the preliminary interviews provided insights as follows.

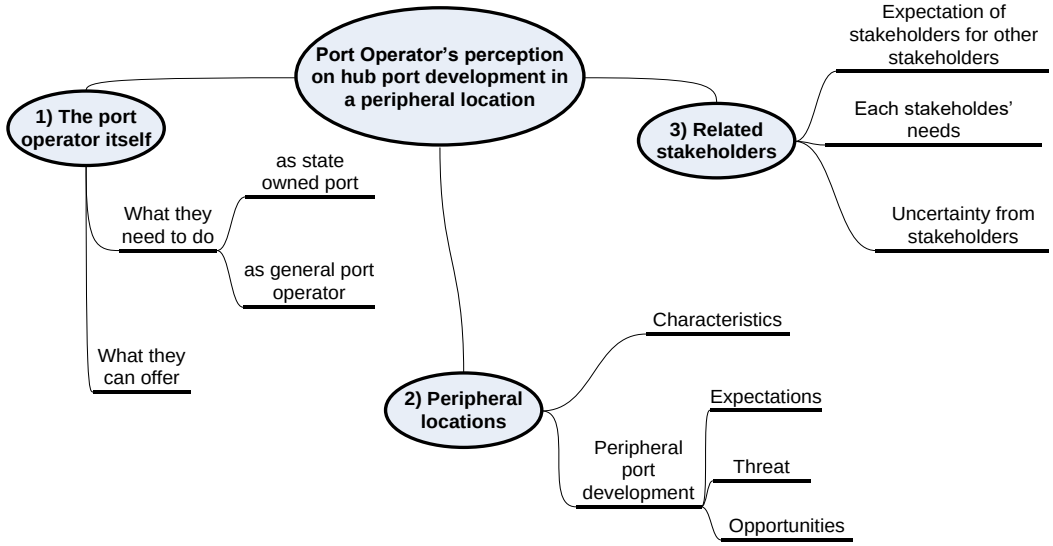
- Characteristics of peripherality.
- The opportunities, threat and expectation of port development in peripheral locations.
- Motivation of a port operator to develop peripheral port.
- Related stakeholders involved in peripheral port development.
- Each stakeholder has different way of perceiving peripheral locations.
- Each stakeholder has different needs and expectations from other related stakeholders.

The Port Operator's Perception on Developing a Hub Port

Recorded interviews were transcribed and analysed manually since its nature is exploratory and not the main data for the Thesis. Two cycles of coding were conducted, which were first cycle coding to highlight basic codes and second cycle coding for clustering and identifying emerging themes (Miles et al. 2014). More detailed, structured, and proper codings were conducted to analyse the main interviews later in Chapter 4 using Qualitative Data Analysis Software (QDAS).

Results shows that most respondents in the preliminary interview are concerned and sympathetic to improve inequality in Eastern Indonesia's economy. They also expressed that the development

of Sorong as a hub port is a very challenging project. Clustering or categorisation of data codings lead into three issues, which are described in Figure 2. The three main issues are as follows: 1) issue on the port operator itself; 2) issue on peripheral location and 3) issue on related stakeholders. Interview findings by individual respondents are summarised in Table 2.



Source: Author

Appendix 2 - Figure 2 Findings from Preliminary Interviews

Appendix 2 - Table 2 Summary of Preliminary Interviews by Individual Respondents

Respondents Code	Summary
PR1	There are opportunities for becoming domestic and international transhipment port by attracting domestic shipping lines first and increase port productivity/efficiency.
PR2	Ports need to provide value added services, increase productivity and equipment/facilities, and sound funding plan.
PR3	Unclear staus on Sorong project, not prioritised anymore; IPC trying to build better relationships with customers.
PR4	Upgrading peripheral ports, planning the network, deal with government institution, attract funding institutions in a realistic plan and excecution.
PR5	Building network in Eastern Indonesia and develop small ports are doable but government policy and initiative are unclear.
PR6	IPC's plan is now a national issue and it is good to build public awareness. However, publication could become deviated to negative issues and there are still business and government regulations to be meet.
PR7	developing peripheral port involves managing all state-owned port operators and support from central government.
PR8	Problem negotiations on port ownership between port operator and regulator.
PR9	Developing peripheral ports should be central government's responsibility.
PR10	Sorong as domestic transhipment then into regional transhipment, still many high-level problems/political.
PR11	There are various problems in the development of Sorong port.
PR12	Law, government regulations and bureaucracy are making peripheral port development difficult.
PR13	Peripheral port is lacking facilities and development plan is forecasted as not feasible.

Source: Author

First, on the port operator iself. Since they are a state-owned company, besides their operations to gain profit for the country, they are also expected to become agent of change in Indonesia's maritime sector. This is reflected in respondents' statements, as example PR2 expressed the following *"Actually as state enterprise, we should not only work to gain profit, we have to be change agent of development. As agent of development we will get losses in the beginning, then later on we will profit. However, we don't know if we are allowed to do such things."*. What they can offer so far are develop plans to upgrade the peripheral port, Sorong, to become a transhipment hub in Eastern Indonesia, coordinate with related Ministries and other state-owned companies, and attract funding institutions to invest in the project. However, there are stil many internal and external challenges to be dealt with (e.g. government regulations and bureaucracy).

Second, on peripheral location and peripheral ports. Respondents perceive peripheral location in Indonesia as the Eastern region, which has higher logistics costs and imbalanced cargo. An example quote by respondent PR4 stated, *"For me the main thing is, if we do Bitung and Makassar then we haven't done anything for eastern Indonesia yet. We need to get out as many as possible. For me that's priority."* The development of peripheral ports is also seen as an opportunity because the changing law on ports and shipping (Act UU no.17 year 2008) stated that private sectors are allowed to build and operate ports in any part of Indonesia, which previously they could not. The port company realise the need to develop ports in peripheral locations as one of the way to expand their business and contribute for the country. They have a positive perception of peripheral port development. They believe that if they loss financially in the early phase, it will be profitable as volume rises. They want to develop a concept named '*Pendulum Nusantara',* which is a continuous shipping service to serve domestic trade as a pendulum back and forth between western and eastern region of Indonesia. However, there are still many challenges.

The threat for the port company is to achieve return on investment and to become profitable, as a business company and contribute to national income. Moreover, another threat is political. It comes from the central government itself because various expectations from different parties/ministries. One party expects them to provide the best service to Indonesian citizens; one party expects not to get any financial loss; and another party expects them not to take over the power they have over small peripheral ports in the Eastern Indonesia. Third, on the port operator's related stakeholders. Issues that emerge are that each stakeholder has different expectations from each other. The port itself has expectations from other stakeholders such as shipping line, central government, local government, etc. Each stakeholder has different needs

and interest that they want to achieve. There is also uncertainty from each of the stakeholders' behaviour. They have different project planning or programmes on where the development is done and how the network will work. Therefore, critical questions arise, which stakeholder should start first? What can each stakeholder do for the development of peripheral ports?

Identification of Stakeholders

There were various stakeholders mentioned in the preliminary interviews. They are described in detail per respondent in Table 3.

Appendix 2 - Table 3 Stakeholders Identified in Preliminary Interviews

Stakeholders	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10	PR11	PR12	PR13
Port Operator													
Pelindo 2/IPC	v	v	v	v	v	v	v	v	v	v	v	v	
Pelindo 2 Port Director / BOD		v	v		v	v	v		v		v	v	
Pelindo 1	v	v	v		v	v	v	v					
Pelindo 3	v	v	v		v	v	v	v					
Pelindo 4	v	v	v	v	v	v	v	v	v		v		
International Port Operators	v	v	v									v	v
Port Developer (PPI)	v	v	v			v	v		v	v		v	
Port Labour			v		v					v			v
Peripheral Port Operator					v			v				v	
Piloting service													v
Shipping Lines / Carrier													
Shipping Lines				v	v							v	v
Domestic Shipping Lines	v	v				v		v		v			
International Shipping Lines	v	v	v			v			v	v			
National Shipping Line (Pelni)										v	v		
National Ferry passenger (ASDP)										v			
Shipper / Cargo Owner													
Cargo Owner			v	v									v
Domestic Cargo Owner	v												
Natural resources	v	v		v				v			v		
Reefer containers cargo				v									
Industries/ manufacturing		v		v				v	v			v	
Retail											v		
National oil and gas company (Pertamina)											v		
Others											v		
Australia	v	v	v	v		v		v	v	v	v		
Papua New Guinea/Pacific Isl	v												
China / Taiwan	v	v	v	v	v			v					
Europe	v	v											
Japan			v							v			
Singapore			v	v									
Thailand / Vietnam				v									
West / South Africa	v			v									
USA / Carribbean	v												

Source: Author

Stakeholders Identified in Preliminary Interviews (Continued)

Stakeholders	PR1	PR2	PR3	PR4	PR5	PR6	PR7	PR8	PR9	PR10	PR11	PR12	PR13
Forwarder / Logistics Company													
Logistics Companies	v	v	v			v							
Trucking												v	
Shipowner Associations						v							
Central Government													
Central Government		v	v	v		v	v	v	v	v		v	
Min. of Transport		v	v	v	v		v	v	v	v	v		
Min of State Owned Enterprise		v		v			v		v	v		v	
Coord. Min of Economic Affair							v				v		
House of Representatives		v								v			
President		v		v	v	v		v		v		v	
Min of Environment / Amdal				v	v					v			
Min of National Planning (Bappenas)				v						v			
Customs	v		v					v					
Government regulations						v						v	
Min of Agraria and Spatial												v	
Political Parties												v	
Local Government													
Local Government		v		v		v	v	v		v	v		
Local Gov. owned Enterprise											v		
Local Enterpreneurs											v		
Local Human Resources											v		
Dept of Transport											v		
Local people/ethnics				v		v				v	v	v	
Local factories				v									
Others													
Investors / Foreign investors		v										v	
World Bank	v												
Developing co. / Special purpose vehicle (SPV)		v			v		v			v			
Foreign Banks					v							v	
Indonesia Investment Coordinating Board							v						
Consultants	v			v	v								
Financial Consultants	v									v			
Non-Government Organisations												v	

Source: Author

Appendix 3 Development of Conceptual Framework

Most Relevant Literature for the Development of Conceptual Framework

Appendix 3 - Table 1 Port Performance and Competitiveness Factors

Studies	Variables	Location of Study
Ha (2003)	Information availability, Port location, Port turnaround, Facilities available, Port management, Port cost, Customer convenience.	Korea
Song and Yeo (2004)	Cargo volume (throughputs handled), Port facility (Berth length), Port location (no of liners calling at ports), Service level (information level), Port expenses.	China
Tongzon and Heng (2005a)	Port operation efficiency level, Port cargo handling charges, Reliability, Preferences of carriers and shippers, The depth of the navigation channel, Adaptability to the environment, Landside accessibility, Product differentiation.	Global ports
Yeo et al. (2008)	Prompt response, 24 hour 7 days a week service, Zero waiting time service, Professionals and skilled labours, Size and activity of FTZ in port hinterland, Volume of total container cargos, Availability of vessel berth on arrival in port, No Port congestion, Water depth, Sophistication level of port information and its application scope, Stability of port's labour, Inland transportation cost, Cost related vessel and cargo entering, Free dwell time on the terminal, Port accessibility, Deviation from main trunk routes, Land distance and connectivity to major shippers, Efficient inland transport network,	Korea and China
Pettit and Beresford (2009)	Intermodal facilities linked to the railway network, Inland Container Depot (ICD), value added services, logistics facilities, port as part of supply chain.	Europe
Lam and Yap (2011)	Shipping capacity, Trade routes, Geographical regions connected to the ports, Shipping lines involved, Extensity and intensity of inter-port relationships.	East Asia
Yuen et al. (2012)	Geographical location, natural factors, hinterland size, Total costs incurred at port, Variety of rates, Container handling efficiency, Storage space, Facility reliability, Number of call at port, Frequency of calling vessels, Variety of shipping lines, Customer service to users, Safety and accidents handling, Electronic information availability, Electronic information accessibility, Transportation cost to hinterland, Transportation time to hinterland, Customs procedures, Government regulatory administrative procedures.	East Asia
Feng et al. (2012)	Availability of shipping services, Price of shipping services, Port/terminal handling, warehousing and other charges, Feeder connections to major deep-seaports and major shipping lines, Port/shipping service is on the cheapest overall route to the destination, Speed of port cargo handling, No Congestion, risks and other risks, Port/terminal security and safety, Technical infrastructure of the port, Proximity of the port to customers and/or supply source, Availability of skilled employees, Quality of landside transport links / intermodal links, Availability and quality of logistics services (warehousing, freight forwarding, cargo handling, etc), Government supports for logistics activities and new development in the region, Depth of navigation channel.	West Europe and East Asia
Woo et al. (2013)	Information and communication system, Long term relationships (and contractual short term), Value added logistics services, Inter-modal transport services, Supply chain integration practices.	Korea

Source: Compiled by Author

Appendix 3 - Table 2 Hub Location Factors

Authors	Variables	Location of Study
Yurimoto and Masui (1995)	Design of a decision support system for overseas plant location. Variables are: Quality of raw materials, labour costs, country risk, financial incentives, highway, market size, proximity to markets, unionisation, airlink, public peace, market competition, seaport, tax, work stoppages, educational facilities, proximity to raw materials, educational level of labour, railway, favourable atmosphere, living costs, skilled labour, industrial labour, surplus labour.	Emerging economies
O'Kelly (1998); Bryan and O'Kelly (1999)	Single assignment model (i.e each city connected to a single hub); multiple assignment model (i.e. allows each city to be connected to more than one hub, it increases the network but decreases individual travel times).	USA
Slack and Wang (2002)	Institutional factors, roles of port authorities and terminal operators, strategy of transnational operators, strong relations port/port authority with shipping, relatively cheap labour cost.	Hong Kong, Shanghai, Ningbo, Singapore.
Notteboom and Rodrigue (2005)	Integration of 'offshore' hubs (i.e location on an island or without a significant local hinterland), great depth, land availability for expansion, labor costs lower (no unions), limited inland investments because cargo is transhipped, terminals are owned or partially owned by shipping lines, provide value-added service, logistics zones, Free Trade Zone.	General ports, USA
Baird (2006)	Mainline ship deviation distance, mainline ship deviation cost, feeder ship distance, feeder ship cost, cost difference by port, mainline string cost saving.	Scapa Flow in Scotland
Ducruet (2006)	Container throughput, No of containerised direct calls, Length of container terminals, Maximum depth of container terminals, No of highways connecting the port city, No of railways connecting the port city, No of container related services, No of international forwarding agents, Population of metropolitan area, Surface of metropolitan area.	Europ and Asia
Notteboom and Rodrigue (2007)	Port regionalization: load centre and multimodal logistics platform in hinterland becoming regional load centre network.	General ports
McCalla (2008)	physical land characteristics (quantity, topography, geology), labour (quantity, quality, stability), perception of the port's importance in the region's economy, transportation infrastructure, room for expansion, water depth in the approach channels, tidal range, ice, shelter from prevailing winds, land ownership, land availability, biophysical sensitivity of land and water, water depth at docks, adjacent land uses and their compatibility to port operations, port/terminal administration and operation.	Jamaica

Source: Compiled by Author

Hub Location Factors (Continued)

Authors	Variables	Location of Study
Notteboom (2009b)	Sources of Path Dependency and Path Disruption in Multi-port Regions: accessibility, newcomers, reputation, market power of large incumbent load centres, stakeholder relations management, port-inland reconfiguration, strategic actions of market players, preferential attachment and embeddedness (becoming locked in), diversity of relations.	Global ports
Rodrigue and Notteboom (2010)	Foreland-based regionalisation: Integrating intermediate hubs with port hinterland, market strategies and policies to integrate port with inland freight distribution centre.	General ports
Monios and Wilmsmeier (2012)	Port-centric logistics, dry ports and offshore logistics hubs.	UK
Wilmsmeier et al. (2014)	Path dependence, new port developments, first mover advantage, port planning regimes, diversification of port role.	Latin America, Carribbean.
Fraser and Notteboom (2014)	Corridor attractiveness: Active interface rail and port, Existence of Regional cargo trackin system, Interface rail and port resource (people), Active interface Port Authority and port, Interface port and Port Authority resourced (people), Active interface Port Authority, Port, rail and Road Hauler, Active interface port and Road Hauler, Infrastructural accesibility to logistics zones from port, Infrastructure ease of accessibility from the inland port to the sea port, Competitive road distances, Rail capacity, Condition rail infrastructure, Level of faith in the corridors management role as the corridor governing structure, Structured budget for the corridor.	Southern Africa
Gohomene et al. (2016)	Port attractiveness: Port infrastructure, Port depth, International network, No Congestion, Geographical advantage, Closeness to main navigation route, Market/cargo volume, Terminal handling charge, Port tariff, Privileged terms to ocean carriers, Political stability, Port security, Service speed, Cargo handling safety, No Problem handling in the port, Port administration and customs regulation.	West Africa

Source: Compiled by Author

Appendix 3 - Table 3 Port Selection Factors

Authors	Variables	Location of Study
Sargent 1938; Alonso and Soriano (2009)	Land distance to port, Inter-port traffic distribution.	
Murphy et al. (1992); Murphy and Daley (1997)	Shipment information / IT, Loss and damage performance, Equipment availability, Low freight charges, Convenient pickup and delivery times, Claims handling ability, Special handling ability, Large volume shipments, Large and odd-sized freight.	
Notteboom (1997)	First in implementing containerisation and new technology, strategic geographical location, heavy financial investments, high productivity.	Europe.
Zohil and Prijon (1999)	minimal diversion distance for the linehaul vessel to call at the port, large container traffic volumes handled by the port.	
UNESCAP (2002)	Basic value-added services, integrated value-added services, traditional port service, high productivity port service.	Asia and Pacific
Mangan et al. (2002)	Port ferry choice in Roro freight transport: Intermodal/ transport links at ports, Speed of getting to/ through ports, Information on sailing options, Risk of cancellation/ delay, Port and ferry chosen is on cheapest overall route, Ferry suitable for unaccompanied/ special cargo, Cost of ferry service/ discounts, Sailing frequency/ convenient sailing times, Facilities onboard for drivers, Opportunity for driver rest break	
Tiwari et al. (2003)	Shippers' port and carrier selection : Ship calls, Total TEU handled at port, No of berths, No of cranes, Water depth, Routes offered, Usage factor, Port and loading charges, Total TEU handled during the year, Fleet size, Distance of shipper from ports, Type of trade, Distance of foreign port in nautical miles.	
Nir et al. (2003)	Travel time, Travel cost, Ship Frequencies, Available Routes, Port facilities, Level of port services	
Malchow and Kanafani (2004)	Port selection: Oceanic distance, Inland distance¸ Sailing headway, Vessel capacity, Probability of last.	

Source: compiled by Author

Port Selection Factors (Continued)

Authors	Variables	Location of Study
Lirn et al. (2004)	Transhipment port selection: Handling cost of containers, Storage cost of containers, Terminal ownership/ Exclusive contracts policy, Management/ Administration efficiency, Vessel turn-around time, Port security, Proximity to import/export areas, Proximity to feeder ports, Proximity to main navigation routes, Port basic infrastructure (including water access), Technical infrastructure of the port, Intermodal links (includes rail, highway and barge).	Taiwan
Notteboom 2005	Value-added activities, an increased focus on the sea-land interface, co-operation and co-ordination among ports, relations with inland centres, diversion distance fom main maritime lanes.	Rhine-Scheldt delta and West Mediterranean
Livey 2005 (in Mangan et al. (2008))	Good geographical position relative to other ports of call for best vessel transit/steaming time and port rotation; close to marketplaces; necessary facilities, services and infrastructure; sufficiently flexible to allow service to be maintained if ships are out of schedule.	General ports
Pando et al. (2005)	Marketing management in World Ports to attract cargo: port ranking, percentage of containers, number of people working in common port marketing organization, port specialization, port hinterland size, number of people working in the commercial department.	Global ports
Ugboma et al. (2006)	Port efficiency, Adequate infrastructure, Frequency of ship visits, Quick response to port users needs, Location, Port charges, Ports reputation for cargo damage.	Nigeria
Guy and Urli (2006)	Water depth, Quay length, Cranes, Intermodal interface, Total transit cost, Service-turn around time, Immediate hinterland, Extended hinterland, Possibility to serve other port within the same service loop.	USA
Blonigen and Wilson (2006)	Inland transport costs, ocean transport costs and port efficiency significantly determines port choice and trade volume in the international trade.	USA
Tongzon and Sawant (2007)	Cargo size, Connectivity, Efficiency, Infrastructure, Location, Port charges, Port services.	Singapore, Malaysia
Chang et al. (2008)	Berth availability, Special requirement, Communication with staff, Service reliability, Worldwide reputation, IT ability, Customs regulation, Cargo profitability, Land connection, Local Cargo volume, Feeder connection network, Port location, Management/ workers relationship, Water draft, Competing carriers, Slot exchange, Transhipment Cargo Volume, Niche market, Balance between I/O Bound, Terminal handling charge, Port dues.	Global shipping lines

Source: compiled by Author

Port Selection Factors (Continued)

Authors	Variables	Location of Study
Wiegmans et al. (2008)	Availability of hinterland connections, Attainability of consumers (large hinterland), Maximum depth of port approaching route, Port ship time (high productivity), Reliability (absence of labour disputes), Reasonable tarrifs, Low Degree of congestion.	Hamburg – Le Havre, Europe
Tongzon (2009)	High port efficiency, Good geographical location, Low port charges, Adequate infrastructure, Wide range of port services, Connectivity to other ports / Shipping frequency, Quick response to port users needs, Reputation for cargo damage.	South East Asia
Tang et al. (2011)	Port choice behaviour in a network, secondary data: Number of port calls, Draught, trade volume, port cargo traffic, ship turnaround time, annual operating hours, port charges, availability of inter-modal transports.	Major Asian ports
Ducruet and Notteboom (2012a)	Enables bundling of cargo, to collect container cargo by calling at various ports along the route instead of focusing on an end-to-end service. Types of bundling: within an individual liner service; combining/linking two or more liner services; symmetric (same ports of call for both sailing directions); asymmetric (different ports of call on the way back).	Global ports
Ducruet and Notteboom (2012b)	Physical and technical port infrastructure, including nautical accessibility (e.g. draft); Terminal infrastructure and equipment, hinterland accessibility and intermodal offer; Geographical location vis-à-vis the main shipping lanes and the hinterland; Port efficiency expressed as port turnaround time, terminal productivity, and cost efficiency; Interconnectivity of the port (sailing frequency of deep-sea and feeder shipping services); Reliability, capacity, frequency, and cost of inland transport services; Quality and cost of auxiliary services such as pilotage, towage and customs; Efficiency and cost of port management and administration (e.g. port dues); Availability, quality and cost of logistic value-added activities (e.g. warehousing) and port community systems; Port security/safety and environmental profile; Port reputation.	Global ports
Yuen et al. (2012)	Cost at port for shipping lines, port location for freight forwarders and shippers.	East Asia
Parola et al. (2013)	Transnational companies entry strategy to Private-Public Partnerhsip in Container Terminal Operations: pivotal role of some firm specific characteristics (market experience and business model), external factors (host country development and market openness, government effectiveness, market concentration degree, and market saturation) and project-related factors (project size, number of partners involved, and equity joint venture with the Port Authority), cross-cultural variables.	Global ports

Source: compiled by Author

Port Selection Factors (Continued)

Authors	Variables	Location of Study
Bae et al. (2013)	Ports' operation costs and congestion delay costs.	Singapore, Malaysia
Kim (2014)	Port Satisfaction: Inter-modal links, port satisfaction, geographical and hinterland advantage, service quality, adequate sailing schedules, convenient service system, promotions, offering assistance, understanding of customer needs, the closest port, proximity of a feeder port, on time, preserving reputation, accessibility of large vessels, availability of information, Port infrastructure.	South Korea
Martinez-Lopez et al. 2015)	Multi Criteria Analysis and Monte Carlo simulation: truck speed, competitiveness of the intermodal transport, geographical location of the routes, European Regulation for road transport (maximum permitted speed and the driver's maximum continuous driving hours on road).	Motorways of the Sea in Europe
Nazemzadeh and Vanelslander (2015)	Port capacity, Port costs, Port productivity, Hinterland Connection, Geographical location.	North Europe
Yang et al. (2016)	Trade routes and destinations, Rapid boutique lines (fewer stops, scheduling reliability, security, safety, more expensive), Foreign sector involvement, Access to hinterland and aggregate demand, Port capacity.	Bohai Rim, China
Yang and Chen (2016)	Stability of political climate, Economic scale of market, Volume of transshipment cargo, Deregulation of international trade and foreign currency exchange system, Efficiency of local government administration, Convenience of customs clearance procedures, Efficiency of port and logistics operations, Integration of customs and port logistics information, Cost of labor, Cost of land, Harbor and stevedoring costs, Transport and distribution costs, Effectiveness of port logistics facilities, Adequacy of the port hinterland for logistics functions, Efficiency of intermodal transport network, Sailing frequency and diversification of shipping routes, Soundness of investment system and incentive measures, Exemption from or reduction of corporate and local taxes, Exemption from and reduction of custom duties and value-added tax for cargo, Financial assistance for investing companies.	Taiwan, Korea, Japan
Notteboom et al. (2017)	Shipping involvement in terminal, shipping alliance formation, demand profile of ports: flow orientation and geographical specialisation, port scale and growth, frequency of ship visits, connectivity; supply profile of ports: capacicty, costs and quality/reliability of nautical acess, terminal operations and hinterland access; market profile of ports: market structure in port, logistics focus of port, port reputation.	Global shipping lines

Source: compiled by Author

Excluded Item Variables from Literature and Quantitative Data Analysis.

Appendix 3 - Table 4 Excluded Item Variables from Literature

Item Variables	Sources	Reason
Low freight charges	Murphey and Daley 1997 (Port selection); Murphey, Daley and Dalenberg 1992	4
Travel cost	Nir et al 2003	4
Ship Frequencies	Nir et al 2003	3
Frequency of ship visits	Ugboma, Ugboma and Ogwude 2006	3
Location	Ugboma, Ugboma and Ogwude 2006	1
Port charges	Ugboma, Ugboma and Ogwude 2006	4
Total transit cost	Guy and Urli 2006	4
Feeder connection network	Chang et al 2008	3
Port location	Chang et al 2008	1
Balance between I/O Bound	Chang et al 2008	3
Terminal handling charge	Chang et al 2008	4
Port dues	Chang et al 2008	3
Reasonable tarrifs	Wiegmans, Hoest and Notteboom 2008	4
Port cargo handling charges	Tongzon and Heng 2005 (Port Competitiveness)	4
Preferences of carriers and shippers	Tongzon and Heng 2005 (Port Competitiveness)	1
Connectivity	Tongzon and Sawant 2007	1
Location	Tongzon and Sawant 2007	1
Port charges	Tongzon and Sawant 2007	4
Good geographical location	Tongzon 2009	1
Low port charges	Tongzon 2009	4
Connectivity to other ports / Shipping frequency	Tongzon 2009	3
adequate sailing schedules	Kim 2014 (Port satisfaction)	3
the closest port	Kim 2014 (Port satisfaction)	1
Port costs	Nazemzadeh and Vanelslander 2015	4
Geographical location	Nazemzadeh and Vanelslander 2015	1
Harbor and stevedoring costs	Yang and Chen 2016	4
Transport and distribution costs	Yang and Chen 2016	4
Sailing frequency and diversification of shipping routes	Yang and Chen 2016	3
Oceanic distance	Malchow and Kanafani 2004 (Port selection)	1
Sailing headway	Malchow and Kanafani 2004 (Port selection)	1
Probability of last	Malchow and Kanafani 2004 (Port selection)	1
No of port calls	Tang, Low and Lam 2011 (Port choice behaviour in a network, secondary data)	3
port charges	Tang, Low and Lam 2011 (Port choice behaviour in a network, secondary data)	4
Speed of getting to/ through ports	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	1
Information on sailing options	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	3
Risk of cancellation/ delay	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	1
Port and ferry chosen is on cheapest overall route	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	1
Cost of ferry service/ discounts	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	4
Sailing frequency/ convenient sailing times	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	4
Facilities onboard for drivers	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	2
Opportunity for driver rest break	Mangan, Lalwani, Gardner 2002 (Port ferry choice in Roro freight transport)	2
Ship calls	Tiwari, Itoh and Doi 2003 (Shippers' port and carrier selection)	3
Routes offered	Tiwari, Itoh and Doi 2003 (Shippers' port and carrier selection)	4
Usage factor	Tiwari, Itoh and Doi 2003 (Shippers' port and carrier selection)	1

Reason 1: irrelevant/unclear; 2: too much detail and unable to be measured; 3: definition and characteristics of peripherality; 4: to be determined in the future after becomes a hub.
Source: Author

Excluded Item Variables from Literature (Continued)

Item Variables	Sources	Reason
Port and loading charges	Tiwari, Itoh and Doi 2003 (Shippers' port and carrier selection)	4
Fleet size	Tiwari, Itoh and Doi 2003 (Shippers' port and carrier selection)	4
Type of trade	Tiwari, Itoh and Doi 2003 (Shippers' port and carrier selection)	2
No of containerised direct calls	Ducruet 2006 (Port-city relationship)	3
Shipping capacity	Lam and Yap 2011 (Liner shipping network and port connectivity in supply chain)	1
Trade routes	Lam and Yap 2011 (Liner shipping network and port connectivity in supply chain)	1
Geographical regions connected to the ports	Lam and Yap 2011 (Liner shipping network and port connectivity in supply chain)	1
Shipping lines involved	Lam and Yap 2011 (Liner shipping network and port connectivity in supply chain)	1
Extensity and intensity of inter-port relationships	Lam and Yap 2011 (Liner shipping network and port connectivity in supply chain)	1
Port location	Ha 2003	1
Port cost	Ha 2003	4
Customer convenience	Ha 2003	1
Port location (no of liners calling at ports)	Song and Yeo 2004	3
Port expenses	Song and Yeo 2004	4
Inland transportation cost	Yeo, Roe and Dinwoodie 2008 (Port competitiveness)	4
Cost related vessel and cargo entering	Yeo, Roe and Dinwoodie 2008 (Port competitiveness)	4
Free dwell time on the terminal	Yeo, Roe and Dinwoodie 2008 (Port competitiveness)	4
Geographical location	Yuen, zhang and Cheung 2012 (Port competitiveness)	1
Total costs incurred at port	Yuen, zhang and Cheung 2012 (Port competitiveness)	4
Variety of rates	Yuen, zhang and Cheung 2012 (Port competitiveness)	4
Number of call at port	Yuen, zhang and Cheung 2012 (Port competitiveness)	3
Frequency of calling vessels	Yuen, zhang and Cheung 2012 (Port competitiveness)	3
Variety of shipping lines	Yuen, zhang and Cheung 2012 (Port competitiveness)	3
Availability of shipping services	Feng, Mangan and Lalwani 2012 (Port performance)	4
Price of shipping services	Feng, Mangan and Lalwani 2012 (Port performance)	1
Port/terminal handling, warehousing and other charges	Feng, Mangan and Lalwani 2012 (Port performance)	4
Feeder connections to major deep-seaports and major shipping lines	Feng, Mangan and Lalwani 2012 (Port performance)	3
Structured budget for the corridor	Fraser and Notteboom 2014 (Corridor attractiveness)	1
Terminal handling charge	Gohomene etl al 2016 (Attractiveness of ports)	4
Port tariff	Gohomene etl al 2016 (Attractiveness of ports)	4
Inter-port traffic distribution	Sargent 1938; Alonso and Soriano 2009 (revealed port selection from secondary data instead of asking port stakeholders about the main factors in port selection)	2
Handling cost of containers	Lirn et al 2004 (Selection of transhipment ports)	4
Storage cost of containers	Lirn et al 2004 (Selection of transhipment ports)	4
Stable structure port hierarchy	Literature on Port Concentration-Deconcentration	3
Economies of scale	Literature on Port Concentration-Deconcentration	3
Technological innovation	Literature on Port Concentration-Deconcentration	1
Direct connections	Literature on Port Concentration-Deconcentration	3
New port development	Literature on Port Concentration-Deconcentration	1
Rise of secondary port	Literature on Port Concentration-Deconcentration	1
Port selection	Literature on Port Concentration-Deconcentration	1
Shipping line concentration	Literature on Port Concentration-Deconcentration	3
Changing port hierarchy	Literature on Port Concentration-Deconcentration	3
part of supply chain	Pettit and Beresford 2009	1
airlink	Yurimoto and Masui 1995	1
Market competition	Yurimoto and Masui 1995	1
quality of raw material*)	Yurimoto and Masui 1995	2
unionisation	Yurimoto and Masui 1995	1
tax	Yurimoto and Masui 1995	4
educational facilities	Yurimoto and Masui 1995	1
educational level of labour	Yurimoto and Masui 1995	2
favourable atmosphere	Yurimoto and Masui 1995	1
living costs	Yurimoto and Masui 1995	1

Reason 1: irrelevant/unclear; 2: too much detail and unable to be measured; 3: definition and characteristics of peripherality; 4: to be determined in the future after becomes a hub. *) recalled from interview results.
Source: Author

Excluded Item Variables from Literature (Continued)

Item Variables	Sources	Reason
physical land characteristics (quantity, topography, geology)*	McCalla 2008	2
perception of the port's importance in region's economy	McCalla 2008	3
tidal range	McCalla 2008	2
ice	McCalla 2008	2
shelter from prevailing winds	McCalla 2008	2
land ownership	McCalla 2008	1
biophysical sensitivity of land and water	McCalla 2008	1
prevalencial attachment	Notteboom 2009b	1
land ownership	McCalla 2008	1
biophysical sensitivity of land and water	McCalla 2008	1
prevalencial attachment	Notteboom 2009b	1
embeddedness (become locked in)	Notteboom 2009b	4
path dependence	Wilmsmeier et al 2014	2
nature of competition	Marei and Ducruet 2016	2
first in implementing containerisation and new technology*	Notteboom 1997	2
heavy financial investment	Notteboom 1997	3
Trade volume in International trade*)	Blonigen and Wilson 2006	3
cross cultural variables	Parola et al 2013	2
truck speed	Martinez Lopez et al 2015	1
regulation for road transport (maximum permitted speed, driver continuous driving hours)	Martinez Lopez et al 2015	1
demand profile of ports (flow orientation, geographical specialisation)	Notteboom et al 2017	2
supply profile of ports	Notteboom et al 2017	2
market profile of ports	Notteboom et al 2017	2
market structure in ports	Notteboom et al 2017	2
frequency of ship visits	Notteboom et al 2017	4
connectivity	Notteboom et al 2017	4
increased focus on sea-land interface	Notteboom 2005	2
cooperation and coordination among ports	Notteboom 2005	2
sufficiently flexible to allow service to be maintained if ships are off schedule	Livey 2005 (in Mangan Lalwani Fynes 2008)	2
not focus on end to end service	Ducruet and Notteboom 2012a	2
quality and cost of auxiliary services (pilotage, towage and customs)	Ducruet and Notteboom 2012b	4
environmental profile	Ducruet and Notteboom 2012b	2
reliability, capacity, frequency and cost of inland transport services	Ducruet and Notteboom 2012b	1
pivotal role of some firm specific characteristics (market experience, business model)	Parola et al 2013	1

Reason 1: irrelevant/unclear; 2: too much detail and unable to be measured; 3: definition and characteristics of peripherality; 4: to be determined in the future after becomes a hub. *) recalled from interview results
Source: Author

Appendix 4 Ethical Approval for Data Collection and Survey Questionnaire

Ethical Approval for Data Collection consists of the following documents:

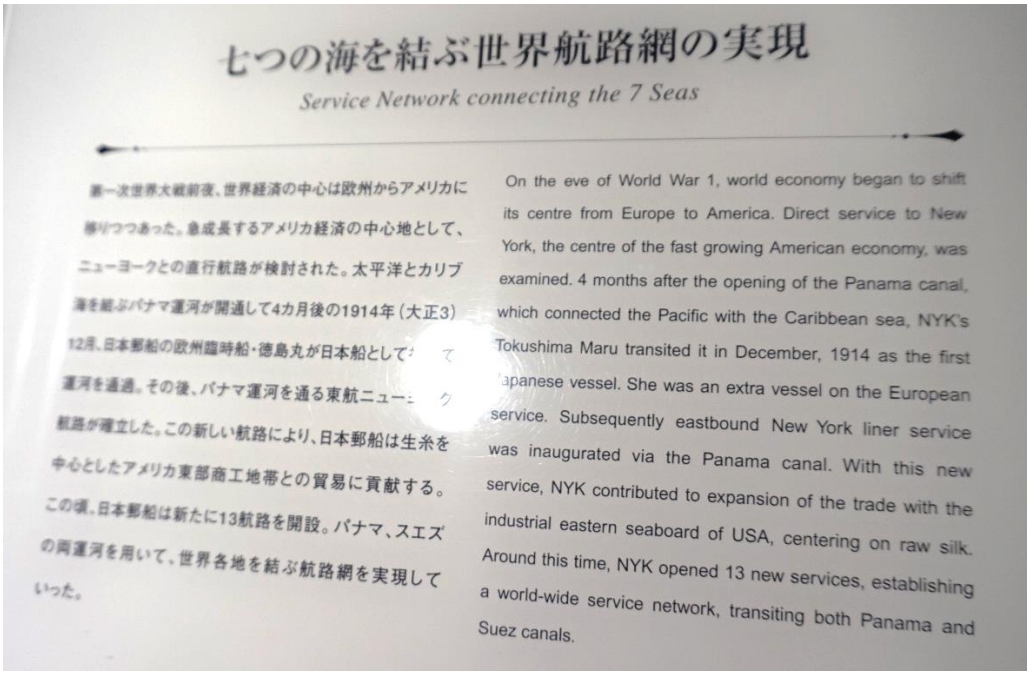
1. Preliminary Interviews
2. Qualitative Phase Interviews
3. Quantitative Phase Survey
4. Online Survey Questionnaire: 48 pages of Survey Qualtrics in PDF.

Appendix 5 Indonesian Ports Viewed by Japanese Shipping Line

These are photographs taken by the Author during her trip to the NYK Shipping Company Museum in Yokohama, Japan, on 25th June 2017. She travelled there before presenting at the International Association of Maritime Economists (IAME) Conference 2017 in Kyoto, Japan. The historical events presented in the museum shows how Indonesia (Jakarta and Surabaya) was inserted in NYK's global shipping routes from the 20th century.

Photo (1): Three main regions served by NYK in the year 1896. It is sen how the Far East and Australia is linked by shipping through the waters of Indonesia's Eastern region.

Photo (2): NYK started 13 new services to establish world-wide network in the year 1917. Jakarta and Surabaya are inserted in 3 of these 13 routes as seen in Photo (3), (4) and (5).


七つの海を結ぶ世界航路網の実現

Service Network connecting the 7 Seas

第一次世界大戦前夜、世界経済の中心は欧州からアメリカに移りつつあった。急成長するアメリカ経済の中心地として、ニューヨークとの直行航路が検討された。太平洋とカリブ海を結ぶパナマ運河が開通して4カ月後の1914年(大正3)12月、日本郵船の欧州臨時船・徳島丸が日本船として[illegible]て運河を通過。その後、パナマ運河を通る東航ニュー[illegible]ク航路が確立した。この新しい航路により、日本郵船は生糸を中心としたアメリカ東部商工地帯との貿易に貢献する。この頃、日本郵船は新たに13航路を開設。パナマ、スエズの両運河を用いて、世界各地を結ぶ航路網を実現していった。

On the eve of World War 1, world economy began to shift its centre from Europe to America. Direct service to New York, the centre of the fast growing American economy, was examined. 4 months after the opening of the Panama canal, which connected the Pacific with the Caribbean sea, NYK's Tokushima Maru transited it in December, 1914 as the first Japanese vessel. She was an extra vessel on the European service. Subsequently eastbound New York liner service was inaugurated via the Panama canal. With this new service, NYK contributed to expansion of the trade with the industrial eastern seaboard of USA, centering on raw silk. Around this time, NYK opened 13 new services, establishing a world-wide service network, transiting both Panama and Suez canals.

Photo (3)

Photo (4)

Photo (5)


西航ニューヨーク線
アルジェ Algier
ポートサイド Port Said
スエズ Suez
神戸 Kobe
横浜 Yokohama
マニラ Manila
イロイロ Iloilo
シンガポール Singapore
ジャカルタ Djakarta
スラバヤ Surabaja
サンフランシスコ San Francisco
ニューヨーク New York
パナマ Panama
スエズ運河 Suez
ジャカルタ Djakarta
スラバヤ Surabaja
パナマ運河 Panama
世界一周線
東航 ニューヨーク線
南米東岸線
地中海線
カルカッタ・ニューヨーク線
カルカッタ・南米線
ハンブルグ線
ニュージーランド線
ポートサイド線
日本・ジャワ カルカッタ線
カルカッタ・シアトル線
リバプール線
西航 ニューヨーク線
1917年（大正6）～1920年（大正9）、日本郵船が新しく開設した遠洋航路
＊写真=国立国会図書館蔵

Appendix 6 Selected Interview Quotes for Chapter 4

Appendix 6 - Table 1 Selected Interview Quotes on Peripheral Ports

Most Dominant Perception of Peripheral Ports	Interview Quotes
Not enough cargo volume	FI_3: "for me the peripherality (physically) exists when the captive of hinterland of that peripheral port cannot be competed with other port's hinterland (can be measured by GDP, population, export import flow)".
	LG_3: "how does your institution make criterias which is high tier office and middle tier office? Its volume".
Imbalanced cargo	CG_9: "Makassar is far bellow, only one sixth. Makassar's containers are only 600 thousand while Surabaya has reached 3 million, so far behind… There are no industries out of Java Island, what cargo could be discharged from out of Java. If container cargo is brought by ship from Jakarta to Medan, the return is only 80%. However, if it is from Jakarta to Makassar, the return does not even reach 50%. From Kalimantan onwards to the Eastern part, they only have natural resource products… Similar with ships from Surabaya to Makassar, the return journey will be empty. Mostly is like that in Indonesia, logistics cost is expensive because ships go back and forth but no cargo on the return journey."
	CO_3: "It is not a public secret that if you send cargo to Papua, the price is twice as sending to Japan for one container, because the infrastructure is not well established. Maybe ships sail rarely or they send the cargo and return empty."
No Connectivity Access	CG_4: "Isolated location such as in the archipelago in Sulawesi, the only access to other islands are by sea."
	CO_1: "for us it is not the distance, it is more on difficullty of transport, access".
Wooden ship "Perintis"	LG_1: "There are locations which can only be accessed by wooden ships, or 'perintis' ships that are allowed by the Minisry of Transport. They are given permit to ease them to serve the citizens… Pelabuhan Rakyat (traditional ports) are served by wooden ships, small ships or feeder ships. However, sometimes the government do not give permition for new development of these traditional ports. Our consultants who try to develop these should be given access. The Ministry should be more proactive to open discussions and dialogue to local government leaders."
	LG_4: "Perintisan (pioneer subsidised shipping) must be held, as government's responsibility, from distric, city to provincial government, to provide service to citizens… especially remote locations… if not government, who will? Private sector is impossible, they calculate profit. If profitable then they will come in."
Outport	SL_1: "Yes, if you have outer ports to be developed then will added up to the cargo that come in."
	SL_5: "Outport is our terminology for ports that do not have direct coverage. So we need to collaborate with local players to transport cargo, lets say from Sorong, Bitung, Ternate, to Jakarta, hence from Jakarta we can continue to transhipment ports abroad. That is for export, the same ways for import."
Feeder	CO_2: "Surely we use feeder service because Indonesia as a whole does not have mother vessels."
	CG_3: "These feeder is still part of the national port, while the 5 main ports are international ports."

Source: Author

Selected Interview Quotes on Peripheral Ports (Continued)

Most Dominant Perception of Peripheral Ports		Interview Quotes
Supporting classification	Government	FI_1: "According to the Ministry of Transport's hierarchy, Main port then Collector port then Feeder port. That is what we know."
		PO_2: "Refering to PP 61/2009, a derivative from Constitution UU 17/2008, those are the category Main port, Collector and Feeder."
		CG_4: "Criteria of the port is in the constitution, details in Ministerial Decree, constitution in UU 17/2008 about shipping. Derivatives in Government Regulations PP no.61/2009 about ports. Details in Ministry of Transport Decree KP 414/2014 about National Port Planning, mentioned there a number of ports."
		LC_3: "It should be agreed at first about the terminology, Main port, collector and feeder."
		CG_9: There are general port (public use) and specific dedicated port (specific company use), also there are commercial and non-commercial port)… They can go up and down the hierarchy, because when we make the National Port Masterplan, it is for 20 years.We also make 5 year plan so they could be local collector port in the first 5 years, then stay the same in the next 5 years, then in the third-5year can become regional collector. It is possible."
Contradicting classification	Government	CO_3: "But there are ports for export and import, there are also for logistics, there is a hierarchy. Pelindo should know more (the government's port hierarchy). For us, we only focus on Tanjung Priook, Kijing, which we consider having lots of export and import. We as private sector see it that way (don't really care about the government's port hierarchy)."
		PO_7: "We are port operator in the Eastern part. We devide ports to 4 classes. The top main class is centre of logistics in Eastern Indonesia, which is only one just Makassar. The next first class is spread in different provinces, there are five which are Balikpapan, Samarinda, Bitung, Ambon, and Sorong. The second class is Pantoloan or Palu, Tarakan, Ternate and Jaya Pura. The third class is Pare Pare, Kendari, Manokwari, Biak, Nunukan. The fourth class is Fak Fak and Toli Toli. So does it follow the Ministry of Transport's hierarchy? No, we cluster them that way according to their access, turnover and activity. Referring to KM 53, the national collector port is just Makassar."
Java Centered development		CO_1: (discussing about fuel or energi distribution) "Yes we have hubs in Ambon, Kupang and Bali. However, Bali is serve this region. The Eastern region is only Ambon and Kupang, with Ambon is the largest. For Sulawesi we have Makassar, Bitung. For Sumatera the hubs are Tanjung Umpan 2 terminals, 1 in Lampung, refineries in Dumai, Plaju, Kampung Pandan. Sumatera and Java is very safe. Moreover, Java is connected by pipes."
		FS_1: (discussing about distribution of investments) "Yes we have the data. Most of them are in Java, but year by year it is increasing for outside of Java. Because we have directed industrial areas to outside of Java, there are policies from Ministry of Industry. It is used to map the industries, those are the distribution of investments."
Remote "terpencil"		CG_1: "Peripheral is considered as 'left behind', remote. The outer most dot on the island. But it can be seen everywhere, it exists in each province."
		CG_6: "Perception of peripheral for us so far is the border area and rural/inland area."

Source: Author

Appendix 6 – Table 2 Selected Interview Quotes on Benefit of Transhipment

Transhipment	Interview Quotes
Benefit of transhipment	CO_8: "It is important for our company, if there are peripheral ports upgraded into transhipment ports and do consolidation, of course we will use them."
	LC_4: "It is beneficial, because from my opinion that is why Sorong is encouraged, as the centre of Papua, Pelni ships are also coming in."
Cost	CO_7: "From our perspective, we look at the cost. If the cost is more efficient from Sorong, then why not. We will consider it. Which one is cheaper, from hub in Surabaya or Sorong. The first point is to look at the logistics transport cost. We are open to possibilities if Sorong is a hub and transport cost is more efficient. We will shift to using Sorong as a hub. We are open."
	FI_2: "There is two ways in looking at the hub and the spoke. One is, I think a lot of attention is being paid in and continues to be paid in… the savings on the shipping side… And many institutions have done studies on it… For me its playing ping pong, because you know its just, you put in the figure, you meet the operational assumptions, then model it say A B C D. which is very nice. And then you take it out of your laboratory, and you try to implement it, it doesn't work."
Special economic zone	CG_4: "In the end we need to know whether there is return cargo, not only returning with empty containers. Meanwhile, Ministry of Transport is now developing the port infrastructure, local government and Ministry of Economic Affair are building special economic zone, they should be supporting each other. We hope that besides having unloading cargo, there will also be loading cargo and no empty ship on the return journey."
	CO_3: "We see that the largest in Sulawesi is Bitung. Because they already have a special economic zone. Its impossible for us to enter the port business if its not feasible. This could be feasible, because there is a special economic zoe and a large fish industry there. We can say there is already volume there."
Collect, consolidate, increase connections	SL_2: "Now we have started to combine ships, Jakarta-Surabaya-Sorong-Jayapura, from Jakarta we have loaded cargo that will be sent to Jayapura, even to Biak. We have started to consolidate. Before, we had to provide each port destination with a dedicated ship, all direct services, so minimum should be prepared 3 ships for one port destination. One goes to sail, one return, uninterrupted. Now, we upgrade the ships, they are larger, so we can go to Manokwari-Sorong-Biak. From each port destination, from Biak returns to Surabaya, then from Surabaya to Nabire, then Serui, Jayapura, and back here. Before we had 6 multiplied by 3 ships so 18 ships in total. Now we can reduce them to only 6-8 ships."
	FI_4: "Well definetly obviously yes. I think the main focus of having port in Sorong where we can connect with Australia, Oceania, Pacific, Fiji, and towards the Asia, China, Japan, or Thailand, or Philipines. I think there are only small scale of business in eastern part of asia at this time, but i think if this can be build there will be much bussier traffic on those area and creating more jobs and i think creating more economic scale within Papua, West Nusa Tenggara, also Sulawesi, North Sulawesi. So, I think it is gonna be more help for Australia and Pacific Oceanea to reconnect to Asia. Because I think afterall in the past maybe they have to go to Surabaya or Tanjung Priuk and if they can go to Sorong in this much more distance wise is much more shorter."
No benefit of transhipment, difficult to implement and unsure	SL_6: "We do not use the any specific terminology. The word hub means the meeting point, consolidate. However, now all ports want to become hub. Ports not developed by Pelindo also seems to become a hub. The terminology of hub in Indonesia does not exist. Unclear. Everytime there will be a new port, it wants to become a hub. To be a hub, there should be special infrastructure, not all new ports can become a hub, there should be supporting infrastructure."
	LG_1: "On this topic we do not hope too much on transhipment like that. We hope its from one place to another (direct), or example from Salawati (Raja Ampat Regency, West Papua), our shortest route, the service is continued to be used. If we make another transhipment is too complicated."
	PO_1: "Certainly yes. But they have to spend more money to build more roads first. Not the port. Not in Jakarta. For example in papua nugini, you cant build road to here, so cargoes will come seabourne. you only can through ports. Not inland transport. So Sorong port is possible if it's the only option they have. If the government for example have done something then it will bring benefit for you? Probably but very little volume. Because this terminal is used to handle 1,5 million TEUs. If we just deliver 20 boxes per month here, it's a very small fraction of business. Very small."

Source: Author

Appendix 6 – Table 3 Interview Quotes on Growth Measurements

Growth Measurements	Interview Quotes
Population	PO_7: "Generally for the eastern part, population very much influence. Industries might not be available. They more likely having natural resources."
	SL_2: "To do our (customer) surveys, we also need to know the population in that area, how much is the population, because it leads to how much is consumption in that area. With this number of population, roughly how much staple food needed in a year, how much to distribute, how much is the operational cost to transport them, that's how we calculate."
GDP / Economic Growth	FI_2: "You always measure GDP growth, important growth in population, because you need to find a way to calibrate the growth. One of the problem you have is that you look at GDP growth and population is growing faster than the GDP growth, then they actually get poor. So that needs to be linked to create a per capita increasing growth. The population itself grows."
	SL_3: "If economic GDP rises, volume also rises."
Throughput Cargo	FI_3: "by export, import, international shipping lines, feeder services."
	PO_5: "From throughput, potential commodity in the region, cargo in the region. For example, Merauke will be built like Sorong, we will see first its potential."
Market Growth	CO_1: "There is a method from the marketing team. However, generally we see them from historical demand, the region's development plans, population growth, growth in the number of vehicles, growth in the number of industries. Every region always has routine meetings and it is reported to us."
	LC_4: "There are growth or potential which is seen from our sales volume. We compare them from some of our customers, because for freight forwarding customers usually are direct from producers (manufacturers). However, for shipping lines their customers are freight forwarders. Hence, wee look at some of our customers and compare them why they are interested to send here, that means marketing is growing in these locations. In the last 3 years I have seen that highest growth happens in Makassar."
Consumer growth	CO_7: "From demand perspective each year there is rising growth. If the population growth is increasing, automatically consumers are also rising. If population growth of 10% then consumer growth is usually 3-5%."
	PO_8: "People getting rich, consumer rising, production of factory rising."
Government Plans	PO_: "That should be considered first, if the region does not get support from the government to develop in the future, surely it will be difficult."
	SL_4: "NYK looks at many aspects of potential from Indonesia, in any way. Basiacally, as long as we are needed by the government of Indonesia, we will help in investing. For example in the LNG sector, and in any potential business. We look at potential and our company's direction."

Source: Author

Appendix 6 – Table 4 Supporting Literature and Evidence for Peripherality as a Cycle

Link	Supporting Literature	Supporting Evidence from Interviews
Low volume → No frequent ship	• Manufacturers in a peripheral location, with relatively **small industrial base and local market lack of direct freight services** and inadequate quality of transport services (McKinnon 1992). • Peripherality becomes worse with the advancement of innovations in transport, only the large cities or large hubs are connected (Knowles 2006). • Low volume or throughput ports are not selected by main shipping lines and less important for the maritime network (Hayuth 1981; Dunbar-Nobes 1984; Mangan and Cunningham 2000; Wang and Slack 2004; Bryan et al 2006; various research compiled in Section 4.4.2).	• PO_4: "**ships wil come if there is cargo**." • SL_5: "the volume is not there yet. If volume is enough, we can use our ship directly without using local players… There was a problem with the fisheries industry and makes exports weaker. It is **not enough for us to continue our direct call** from Bitung, so we decided to stop the direct call 1.5 years ago." • SL_6: "Sorong **does not have the ability to produce something to be taken out of** for now." • SL_8: "Main ports in Indonesia are Jakarta, Semarang, Surabaya, Belawan. Out of those are **because of small volume, the port is rarely visited so we call it outport**. However, mainly Indonesian shipping lines see outports as potential." • CO_2: "In the case of Sorong, there are no direct ship service coming there, but throuogh Jakarta-Surabaya-Makassar-Bitung-Ambon-Sorong. Pelni ship (state-owne shipping company) goes through Bau Bau-Bitung-Sorong or Manokwari or Jayapura, or through Surabaya-Bali-Lombok-then Sorong. **Pelni uses those route because it's the 'fat/juicy' route, there is always cargo."** • FS_2: "What is fundamental besides building these ports is finding the way for Eastern Indonesia itself to generate cargo. Because you have the phrase "dimana ada gula ada semut" (if there is sugar, there will be ants**), as long as you have cargo shipping will take place.** And I think its often a misunderstanding. If you go to Eastern Indonesia, there is shipping. Even when I was in Tobelo two years ago. Port operations is not a beauty, they want to build port for operations, but to get it done there is a ship, even if its just pinisi vessel they will fill it. Right so its not that nothing is happening. But its very informal".
No frequent ship → Insufficient port infrastructure	• Being feeders at the lowest port hierarchy is based on low efficiency per cost (Robinson 1998). • Port tangible and intangible aspects are needed to attract shipping lines (various research compiled in Section 4.5.2).	• PO_2: "Criteria to upgrade its status from feeder ports (pengumpan) to collector ports (pengumpul) is definitely **upgrading facilities, and facilities could be completed if there is demand."** • SL_7: "Last time it took 6 days for our ship to be loaded and unloaded. Facilities are old. With or without incentives, there are congestion. **We support if the port wants to become a hub but the facilities should be modern…** All ports in Indonesia, except New Priok port and Teluk Lamong (Surabaya) are old ports, developed by the Dutch." • SL_8: "**We haven't expand our business there, frankly because the infrastructure is not sufficient."** • FI_1: "**The barrier lies in the port's facilities and it becomes the reason concentration happens in large ports.** Especially in Eastern Indonesia, more archipelagic in nature compared to Java island which can use land transport/routes more."
Insufficient port infrastructure → low economic activities	• Peripheral ports have less bargaining power (Heaver et al 2005). • Core-periphery pattern is a result of economies of scale, transportation costs and manufacturing's share in a national income (Krugman 1991b). • Port Economic impact studies (various studies compiled in Section 3.3.1)	• CG_2: "Our gap / inequality from east west north south, cities and villages, also in income distribution. If we analyse it, development centres are still in Western of Indonesia, especially in Java. Remote areas should be built as strategic economic activities. Because of the topography and archipelagic nature, hence, transport sector is critical to be developed. Because **transport is becoming significant barriers for development to go there."** • CG_9: "Now lets compare other ports with central Indonesia, almost 80-90% of our nation's cargo is in the western part. **Even almost 60-70% of our nation's cargo, beside natural resources, is in Tanjung Priok (Jakarta).** Because the containers could be 6 million alone. This means containers in Tanjung Priok is more or less 50% of the total containers in Indonesia, in only one port, the others are less compared to Tanjung Priok." • LG_4: "**So 'perintis' (subsidised shipping) here is applied to our policies and prioritised because how can we develop our developed regions, while we still have so many under developed ones.** Hence, there development can be distributed to all the citizens in every 'edge' locations." • CO_3: "Yes we understand, and Indonesia is huge, peripheral locations are many and infrastructure are in minimum, starts from electricity, logistics services. **I think without electricity and logistics, the region's development will be slow."** • FI_5: "As I said earlier that small ports needs to be built, that is why, **the government's role is to build infrastructure, means and infrastructure. Then, private sector can come in and develop, economy will rise.** That's is the basis."

Source: compiled by Author

Supporting Literature and Evidence for Peripherality as a Cycle (Continued)

Link	Supporting Literature	Supporting Evidence from Interviews
low economic activities → low population and political power	• Location is considered in political-economic processes (Swyngedouw 1992). • Economical peripherality leads to spatial peripherality (Erkut and Ozgen 2003). • Aspatial aspects related to peripherality (Copus 2001).	• LG_1: "Most important, is that **transport access is not regular. Second, it can be seen from the profile of the region, very poor,** do not have basic needs – clothes, food, education, nutrition- it is very obvious. Good quality of human resources from these peripheral locations are difficult to find. From day to day just becomes a 'heritage', **they can not get out of poverty itself** because they do not have the chance." • LC_4: "**In small peripheral ports, the port labour cost is very expensive, and development is still very low** so for example cement is very much needed even the price is so expensive." • FI_4: "Maybe like company business in more rural area are not necesassry our clients but may be the customers of our clients. The nature of our country is such a large concentration of population and GDP centered in Java. **As we go to the rural side, theres less people, theres of course a lot of growth from smaller scale."** • PO_1: "The driving force is do you have a good chunk of population there. **If there are no people living, very little economic activities. Population is very important**. Secondly is the concentration of industries around the area. That will be the driving force to attract more cargoes, coming in and out."
Low population and political power → low volume and low connectivity	• Peripherality as remoteness and inaccessibility to transport network, market, economic and population centres (Langholm 1991; Ball 1996; Copus 2001; Bickerstaff et al 2006).	• CO_7: "From demand perspective each year there is rising growth. **If the population growth is increasing, automatically consumers are also rising**. If population growth of 10% then consumer growth is usually 3-5%." • PO_7: "In the east, **population is critical, industries are not yet established."** • CO_6: "If we talk about **industries, whatever the industry is, its resources including raw material and human resource, it is the key.** Same applies in Sorong, how is the resources, the people. If the government develops industries in Sorong, in the end will there be employment, or **will the people/labour be imported from Java?** It is such a pity." • CG_2: "Specifically, in remote areas, there are 3 pillars concept of work. **First, is to increase capacity and capability of human resource.** The issue of education and health, because human resource is low, then quality of health is also low. **Second, is to generate economic development,** the village's economic generator (lumbung ekonomi desa), there are stronger human resources here. We try to look for potential commodity here and the state-owned government companies are the foundation. Third is village culture circle (lingkar budaya desa), we need to strengthen local culture to support economy and become productive, for example not to be greedy and to keep nature's sustainability." • SL_3: "**If economic GDP rises, volume also rises**."

Source: compiled by Author

Appendix 7 Statistical Output (IBM SPSS 23) for Chapter 5

Appendix 7 – Table 1 Harman Single Factor Score

Total Variance Explained

Component	Initial Eigenvalues			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	30.426	25.568	25.568	30.426	25.568	25.568
2	6.199	5.210	30.778			
3	5.209	4.378	35.155			
4	4.561	3.833	38.988			
5	3.490	2.933	41.921			
6	2.942	2.473	44.393			
7	2.778	2.334	46.728			
8	2.568	2.158	48.886			
9	2.461	2.068	50.954			
10	2.148	1.805	52.759			
11	2.015	1.693	54.452			
12	1.940	1.630	56.082			
13	1.788	1.503	57.585			
14	1.758	1.477	59.062			
15	1.691	1.421	60.483			
16	1.579	1.327	61.810			
17	1.528	1.284	63.094			
18	1.479	1.243	64.337			
19	1.439	1.209	65.546			
20	1.358	1.141	66.687			
21	1.341	1.127	67.814			
22	1.335	1.122	68.936			
23	1.316	1.106	70.043			
24	1.231	1.034	71.077			
25	1.215	1.021	72.098			
26	1.176	.988	73.086			
27	1.139	.957	74.043			
28	1.075	.903	74.947			
29	1.061	.892	75.839			
30	1.022	.859	76.698			
31	.999	.839	77.537			
32	.971	.816	78.353			
…	..	…	…			
118	.015	.013	99.989			
119	.013	.011	100.000			

Extraction Method: Principal Component Analysis.

Appendix 7 – Table 2 Total Variance Explained in EFA Unrotated

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	29.539	26.611	26.611	29.539	26.611	26.611
2	6.051	5.451	32.062	6.051	5.451	32.062
3	4.762	4.290	36.352	4.762	4.290	36.352
4	3.468	3.124	39.477	3.468	3.124	39.477
5	2.857	2.574	42.050	2.857	2.574	42.050
6	2.737	2.466	44.516	2.737	2.466	44.516
7	2.549	2.296	46.813	2.549	2.296	46.813
8	2.438	2.197	49.010	2.438	2.197	49.010
9	2.135	1.924	50.933	2.135	1.924	50.933
10	1.953	1.759	52.692	1.953	1.759	52.692
11	1.899	1.711	54.404	1.899	1.711	54.404
12	1.758	1.584	55.987	1.758	1.584	55.987
13	1.723	1.552	57.539	1.723	1.552	57.539
14	1.651	1.487	59.026	1.651	1.487	59.026
15	1.539	1.387	60.413	1.539	1.387	60.413
16	1.504	1.355	61.768	1.504	1.355	61.768
17	1.448	1.304	63.072	1.448	1.304	63.072
18	1.403	1.264	64.336	1.403	1.264	64.336
19	1.362	1.227	65.563	1.362	1.227	65.563
20	1.325	1.194	66.757	1.325	1.194	66.757
21	1.310	1.180	67.937	1.310	1.180	67.937
22	1.231	1.109	69.046	1.231	1.109	69.046
23	1.212	1.092	70.138	1.212	1.092	70.138
24	1.186	1.069	71.206	1.186	1.069	71.206
25	1.149	1.035	72.241	1.149	1.035	72.241
26	1.110	1.000	73.241	1.110	1.000	73.241
27	1.086	.979	74.220	1.086	.979	74.220
28	1.042	.939	75.158	1.042	.939	75.158
29	.979	.882	76.040			
30	.968	.872	76.912			
31	.952	.858	77.770			
32	.882	.794	78.565			
…						
…						
111	.018	.016	100.000			

Extraction Method: Principal Component Analysis.

Appendix 7 – Table 3 Total Variance Explained in EFA Varimax 3 Factors

Total Variance Explained

Component	Initial Eigenvalues			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	29.539	26.611	26.611	15.499	13.963	13.963
2	6.051	5.451	32.062	14.059	12.666	26.629
3	4.762	4.290	36.352	10.793	9.723	36.352
…						
…						
111	.018	.016	100.000			

Extraction Method: Principal Component Analysis.

Appendix 7 – Table 4 Mean and Median value of Factor-1, Factor-2 and Factor-3

All

Statistics

		F1	F2	F3
N	Valid	171	171	171
	Missing	0	0	0
Mean		6.264166162532770	5.851851851851850	4.901913875598090
Median		6.379310344827590	5.866666666666670	4.863636363636360
Std. Deviation		.558091600073629	.704858128877429	.735752179303497

PO

Statistics

		F1	F2	F3
N	Valid	29	29	29
	Missing	27	27	27
Mean		6.084423305588590	5.788505747126440	4.760188087774290
Median		6.137931034482760	5.733333333333330	4.772727272727270
Std. Deviation		.581594883080883	.548900478306258	.634144618090782

SL

Statistics

		F1	F2	F3
N	Valid	26	26	26
	Missing	0	0	0
Mean		6.393899204244030	6.007692307692310	4.896853146853150
Median		6.620689655172410	6.300000000000000	4.886363636363640
Std. Deviation		.531900152174531	.667286890978532	.597730928755869

CO

Statistics

		F1	F2	F3
N	Valid	49	49	49
	Missing	3	3	3
Mean		6.353976073187900	5.795918367346940	4.968460111317250
Median		6.448275862068970	5.733333333333330	5.000000000000000
Std. Deviation		.540739038171006	.716267093166253	.743382425989496

Mean and Median value of Factor-1, Factor-2 and Factor-3 (continued)

LC

Statistics

		F1	F2	F3
N	Valid	26	26	26
	Missing	3	3	3
Mean		6.083554376657830	5.620512820512820	4.846153846153850
Median		6.068965517241380	5.666666666666670	4.636363636363640
Std. Deviation		.683919116628703	.868770621719216	.688041528041902

CG

Statistics

		F1	F2	F3
N	Valid	14	14	14
	Missing	3	3	3
Mean		6.379310344827590	6.052380952380950	5.100649350649350
Median		6.413793103448280	6.200000000000000	5.181818181818180
Std. Deviation		.473383774471479	.685966070989995	1.056896729380950

LG

Statistics

		F1	F2	F3
N	Valid	3	3	3
	Missing	3	3	3
Mean		6.195402298850570	5.888888888888890	4.696969696969700
Median		6.379310344827590	5.666666666666670	4.818181818181820
Std. Deviation		.443386241884734	.566993369874359	.250344115785732

FI

Statistics

		F1	F2	F3
N	Valid	5	5	5
	Missing	3	3	3
Mean		6.386206896551720	6.053333333333330	4.518181818181820
Median		6.241379310344830	6.133333333333330	5.090909090909090
Std. Deviation		.356192041617013	.723264205606161	1.061439066815420

Others

Statistics

		F1	F2	F3
N	Valid	19	19	19
	Missing	3	3	3
Mean		6.270417422867510	5.989473684210530	5.016746411483250
Median		6.379310344827590	6.066666666666670	4.954545454545450
Std. Deviation		.469616288089197	.711896496116245	.808757524992674

Appendix 7 – Table 5 Non Response Bias Test

Group Statistics

EARLYLATE		N	Mean	Std. Deviation	Std. Error Mean
W	Early	85	5.06471	1.085896	.117782
	Late	80	5.06563	.923707	.103274

Independent Samples Test

		Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the Lower	Interval of the Upper
W	Equal variances assumed	.887	.348	-.006	163	.995	-.000919	.157414	-.311753	.309914
	Equal variances not assumed			-.006	161.384	.995	-.000919	.156646	-.310260	.308421

no significant differences

Group Statistics

JavaNonjava		N	Mean	Std. Deviation	Std. Error Mean
W	Java	131	5.10496	.994675	.086905
	NonJava	22	5.01705	.814942	.173746

Independent Samples Test

		Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Interval of the Lower	Interval of the Upper
W	Equal variances assumed	.235	.629	.393	151	.695	.087916	.223882	-.354428	.530261
	Equal variances not assumed			.453	32.494	.654	.087916	.194268	-.307560	.483393

no significant differences

Appendix 8 Statistical Output (IBM SPSS 23) for Chapter 6

Appendix 8 – Table 1 EFA results for Latent Variable Willingness (X8)

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.905
Bartlett's Test of Sphericity	Approx. Chi-Square	817.622
	df	28
	Sig.	.000

Communalities

	Initial	Extraction
Q9_Q9_1	1.000	.734
Q9_Q9_2	1.000	.741
Q9_Q9_3	1.000	.822
Q9_Q9_4	1.000	.550
Q9_Q9_5	1.000	.766
Q9_Q9_6	1.000	.488
Q9_Q9_7	1.000	.507
Q9_Q9_8	1.000	.228

Extraction Method: Principal Component Analysis.

Total Variance Explained

Component	Initial Eigenvalues			Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	4.836	60.451	60.451	4.836	60.451	60.451
2	.880	10.997	71.447			
3	.714	8.928	80.376			
4	.541	6.759	87.134			
5	.381	4.768	91.903			
6	.253	3.159	95.062			
7	.215	2.687	97.749			
8	.180	2.251	100.000			

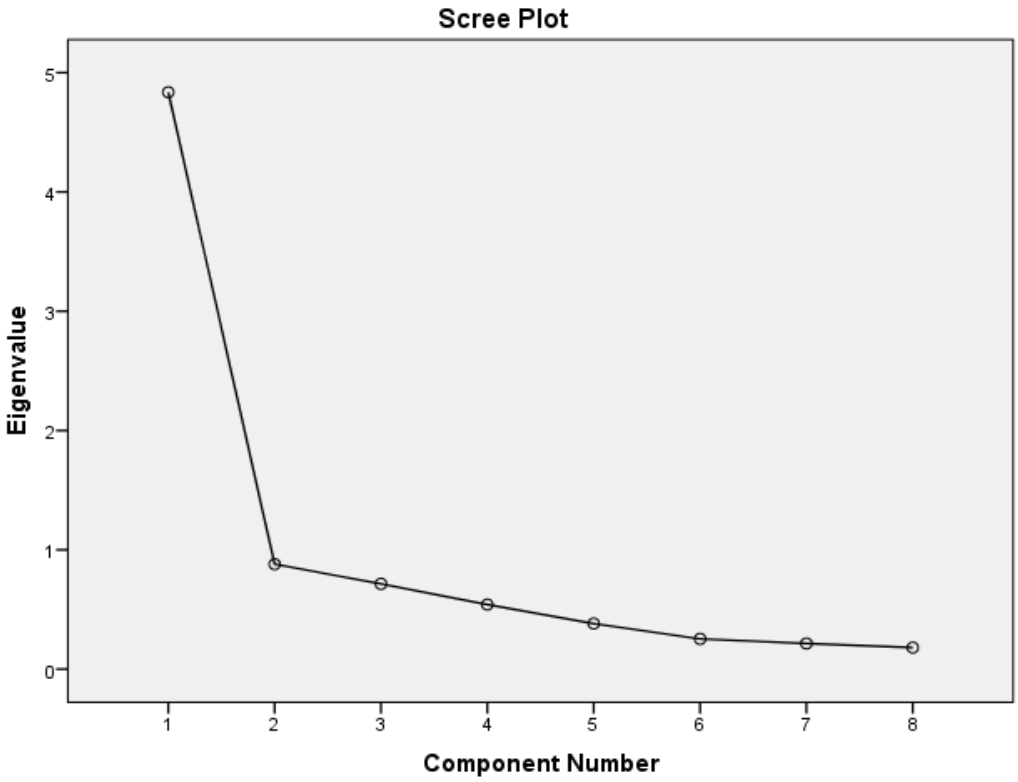
Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component
	1
Q9_Q9_1	.857
Q9_Q9_2	.861
Q9_Q9_3	.906
Q9_Q9_4	.742
Q9_Q9_5	.875
Q9_Q9_6	.699
Q9_Q9_7	.712
Q9_Q9_8	.478

Extraction Method: Principal Component Analysis.

a. 1 components extracted.



Appendix 8 - Figure 1 EFA results for Latent Variable Willingness (X8) in Scree Plot

Appendix 8 – Table 2 Correlation Tests between F1, F2, F3 with W, W1 and W2.

Correlations

			F1	F2	F3	W	W1	W2
Kendall's tau_b	F1	Correlation Coefficient	1.000	.460**	.378**	.159**	.161**	.142**
		Sig. (2-tailed)		.000	.000	.003	.005	.010
		N	171	171	171	165	165	165
	F2	Correlation Coefficient	.460**	1.000	.346**	.194**	.209**	.167**
		Sig. (2-tailed)	.000		.000	.000	.000	.002
		N	171	171	171	165	165	165
	F3	Correlation Coefficient	.378**	.346**	1.000	.143**	.137*	.137*
		Sig. (2-tailed)	.000	.000		.008	.016	.012
		N	171	171	171	165	165	165
	W	Correlation Coefficient	.159**	.194**	.143**	1.000	.768**	.850**
		Sig. (2-tailed)	.003	.000	.008		.000	.000
		N	165	165	165	165	165	165
	W1	Correlation Coefficient	.161**	.209**	.137*	.768**	1.000	.574**
		Sig. (2-tailed)	.005	.000	.016	.000		.000
		N	165	165	165	165	165	165
	W2	Correlation Coefficient	.142**	.167**	.137*	.850**	.574**	1.000
		Sig. (2-tailed)	.010	.002	.012	.000	.000	
		N	165	165	165	165	165	165
Spearman's rho	F1	Correlation Coefficient	1.000	.620**	.532**	.229**	.216**	.199*
		Sig. (2-tailed)		.000	.000	.003	.005	.010
		N	171	171	171	165	165	165
	F2	Correlation Coefficient	.620**	1.000	.475**	.274**	.282**	.230**
		Sig. (2-tailed)	.000		.000	.000	.000	.003
		N	171	171	171	165	165	165
	F3	Correlation Coefficient	.532**	.475**	1.000	.207**	.186*	.193*
		Sig. (2-tailed)	.000	.000		.008	.017	.013
		N	171	171	171	165	165	165
	W	Correlation Coefficient	.229**	.274**	.207**	1.000	.892**	.939**
		Sig. (2-tailed)	.003	.000	.008		.000	.000
		N	165	165	165	165	165	165
	W1	Correlation Coefficient	.216**	.282**	.186*	.892**	1.000	.698**
		Sig. (2-tailed)	.005	.000	.017	.000		.000
		N	165	165	165	165	165	165
	W2	Correlation Coefficient	.199*	.230**	.193*	.939**	.698**	1.000
		Sig. (2-tailed)	.010	.003	.013	.000	.000	
		N	165	165	165	165	165	165

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Appendix 10 Publications during PhD Research

Conference Paper

- Wiradanti, B. et al. 2017a. Investing in peripheral ports: Perception of stakeholders in the Indonesian port and maritime industry. In: *Logistics Research Network (LRN) Conference.* Southampton Solent University, United Kingdom, 7-9 September 2016. The Chartered Institute of Logistics and Transport (CILT),
- Wiradanti, B. et al. 2016. Trends in trade and port development of rising economies: Mexico and Indonesia. In: *Logistics Research Network (LRN) Conference.* Hull University, United Kingdom, 7-9 September 2016. The Chartered Institute of Logistics and Transport (CILT),
- Wiradanti, B. et al. 2017b. Peripherality in ports: A literature review on concentration – deconcentration factors. In: *International Association of Maritime Economists (IAME) Conference.* Kyoto, Japan, 27-30 June 2017.
- Wiradanti, B. et al. 2018b. In between global main shipping routes: Similarities and differences between iIndonesia and the Caribbean. In: *Maritime Conference Bahamas.* Bahamas, 17-19 October.

Published Paper

- Wiradanti, B. et al. 2018a. Ports, peripherality and concentration - deconcentration factors: A review. *Maritime Business Review* 3(4), pp. 375-393.

Research Collaboration

- Visiting Research with Prof. Masato Shinohara, September – October 2018 in Osaka and Kyoto, Japan. Sponsored by Osaka Ports Promotion Association.

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ETHICS 2

FULL ETHICAL APPROVAL FORM (STAFF/PHD STUDENTS) or students referring their form for a full ethical review

Cardiff Business School
Cardiff University

Ysgol Fusnes Caerdydd
Prifysgol Caerdydd

(For guidance on how to complete this form, please see Learning Central – CARBS RESEARCH ETHICS)

If your research will involve patients or patient data in the NHS then you should secure approval from the NHS Health Research Authority. Online applications are available on http://www.hra.nhs.uk/resources/applying-for-reviews/

NB: Safety Guidelines for researchers working alone on projects – please go to this University's web link to learn about safety policies - http://www.cf.ac.uk/osheu/index.html

Name of Lead Researcher : **Bahana Wiradanti (C1459530)**

School: Cardiff Business School, Logistics and Operations Management (LOM) section

Email: WiradantiB@cardiff.ac.uk

Names of other Researchers: -

Email addresses of other Researchers : -

Title of Project:

Development of Peripheral Ports in Indonesia

Start and Estimated End Date of Project: 25th April - 31st May 2016

Aims and Objectives of the Research Project:
This is an introduction phase before the main data collection of PhD research. The purpose is to explore historical background, current status and future plans for the development of peripheral ports in Indonesia. This will be used as the context for the Thesis. Data is collected by semi-structured interviews to relevant people in a port company. The aim of the Thesis itself is to identify factors for a peripheral port to reduce its peripherality by becoming a hub.

Please indicate any sources of funding for this project: -

1. Describe the methodology to be applied in the project

This project follows a 'loose' or 'inductive' approach, which aims to familiarise the researcher with the intended topic (peripheral port development) and the relevant respondents. Loose designs are better for exploring unfamiliar phenomena or complex processes (Miles et al. 2014, p.19), while an inductive approach is used to 'build theory grounded from data' (Saunders et al. 2007, p.487). However, to avoid being extremely loose and maintain the scope of study, interview questions have been constructed.

The interview itself is following a semi-structured approach because it provides chances to explore and 'probe' answers from participants (Saunders et al. 2007, p.315) and enables the researcher to follow up the participant's answer (Bryman and Bell 2003, p.343). The questions for interviews are attached in Appendix-1.

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Saunders, M. et al. 2007. *Research methods for business students*. 4 ed. London: Prentice Hall.

2. *Describe the participant sample who will be contacted for this Research Project. You need to consider the number of participants, their age, gender, recruitment methods and exclusion/inclusion criteria.*

Semi structured interviews will be conducted with professionals from a port company based in Jakarta, Indonesia. The relevant respondents are ones that are working with the company's strategic planning and port development projects, with positions such as senior staff up to Directors. The total number of participants will be ±15, aged from 30 to 60 years old, both gender male and female. They are mainly recruited through the interviewer's professional connections and considering their current job/position. They are also considered as the 'gatekeeper' for further main data collection of the PhD research. There are no gender and age discrimination issues.

3. *Describe the method by which you intend to gain consent from participants.*

Consent from participants will be sought by telephone and e-mail prior to the interviews. As part of the interview process, a brief introduction to the research purpose and plan will be given. This will also ensure the clarity of ethical considerations between interviewer and interviewee. Participation in this research is entirely voluntary and each interviewee can withdraw from the research at any time without giving a reason. Permission will also be sought to record the information from interviews. The summary of the research findings will be available to the participants at the end of the entire research work. The invitation letter and the consent form which will be given to prospective participants are shown in the Appendix-2 and Appendix-3.

4. *Please make a clear and concise statement of the ethical considerations raised by the project and how you intend to deal with them throughout the duration of the project. (Please use additional sheets where necessary.)*

Relevant steps to be taken in this research will rigorously follow the Association Business Schools (ABS) ethics guide. Appropriate anonymity and confidentiality will be guaranteed for the participants. Respondents will be informed that their details will be kept anonymous in the final version of the thesis. Respondents will have the right not to answer any questions during the session. If required, the respondent is able to answer "no comment" at any time if they feel uncomfortable about the question. The company's approval in this study does not oblige respondents to participate in the study. Participation will not be linked in any way with their job performance, nor will the researcher share the names of participants with the company.

In addition, permission will be granted for the interview to be recorded. Notes will be taken during interviewing and the respondent has the right to review the notes made during the session. If specified by the respondent, the name of the respondent will not be recorded on the tape and will be substituted by letters (e.g. Mr.X). These recorded materials will be kept locked in a suitable case or encrypted digitally when not being used. Transcripts of the interviews will be available to the participants.

5. *Please complete the following in relation to your research project:*

		Yes	No	n/a
(a)	Will you describe the main details of the research process to participants in advance, so that they are informed about what to expect?	☒	☐	☐
(b)	Will you tell participants that their participation is voluntary?	☒	☐	☐
(c)	Will you obtain written consent for participation?	☒	☐	☐
(d)	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
(e)	If you are using a questionnaire, will you give participants the option of omitting questions they do not want to answer?	☐	☐	☒
(f)	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
(g)	Will you offer to send participants findings from the research (e.g. copies of publications arising from the research)?	☒	☐	☐
(h)	Will you consider and take into account issues concerning the health and safety of the researchers and participants. The University's health and safety policy can be found at http://www.cf.ac.uk/osheu/index.html	☐	☐	☒

(i)	If working with children and young people please confirm that you have visited this website : Working with children and young people and vulnerable adults please go to web link - http://www.cardiff.ac.uk/racdv/ethics/guidelines/index.html	☐	☐	☒
(j)	**DATA PROTECTION:** (A) Will any non-anonymised and/or personalised data be generated? (B) If "YES" will it be stored beyond the end of the project/archived? http://www.cardiff.ac.uk/socsi/research/researchethics/destructionofdata/index.html	☐ ☐	☒ ☒	☐ ☐
(k)	The study does not include the use of a drug? If no, you will need to contact Research Governance before submission (resgov.cf.ac.uk)	☒	☐	☐
(l)	The study does not involve the collection or use of human tissue? If no, you will need to contact Research Governance before submission (resgov.cf.ac.uk)	☒	☐	☐

PLEASE NOTE:
If you have ticked **No** to any of 5(a) to 5(l), please give an explanation on a separate sheet.
(Note: N/A = not applicable)

If there are any other potential ethical issues that you think SREC should consider please explain them on a separate sheet. It is your obligation to bring to the attention of the Committee any ethical issues not covered on this form and checklist.
This completed application form to be submitted to SREC Secretary Lainey Clayton Claytonlb@cf.ac.uk to be reviewed by the School's Research Ethics Committee.

Signed: Bahana Wiradanti

Print Name: Bahana Wiradanti

Date: 17/3/16

SUPERVISOR'S DECLARATION (Student researchers only): As the supervisor for this student project I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Signed:

Print Name: Dr. Stephen Pettit

Date: 17/3/16

TWO copies of this form (and attachments) MUST BE OFFICIALLY STAMPED BEFORE any research project work is undertaken -

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed School procedures and is now approved.

Stamped by School :
Date: 6/4/2016

Appendix-1

List of Respondents, General Questions, and Specific Questions

Development of Peripheral Ports in Indonesia

No.	Respondents	Questions
1	**Relevant Divisions**	**General Questions:** 1) What is the historical background for the development of peripheral ports in Indonesia? 2) How is the current status of the development? 3) What are the difficulties in the development? 4) What are the future plans?
	- Corporate Strategy Bureau	
	- Port Development Subsidiary company	
	- Sorong Development special division	
2	**Gatekeepers**	**Specific Questions:**
	- Corporate Secretary	1) How has the development of peripheral ports been disclosed/explained to public? 2) How can I arrange interviews with the Directors, related subsidiary companies, customers and related government officers?
	- Human Resource	1) How is the human resource allocated for the development of peripheral ports? 2) How can I arrange an interview with the Directors, related subsidiary companies, customers and related government officer?
	- Port Customer Relation	1) How can I get access and contacts to the port's customers such as shipping lines, shippers, freight forwarder for main data collection?

Appendix-2

Invitation Letter

Logistics and Operations Management Section
Cardiff Business School
Aberconway Building
Cardiff University
Cardiff, United Kingdom
CF10 3EU
Email: WiradantiB@cardiff.ac.uk

Company Address

Dear (name),

I am a second-year PhD student at Cardiff Business School conducting the academic research on the topic of peripheral port and container hub port development. The main purpose of my Thesis is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub. Initial data is needed on peripheral ports in Indonesia in order to explore historical background, current status and future development plans. This will be used as the context for the PhD Thesis.

As your company/authority is involved in the ports and maritime logistic industry, conducting an in-depth semi-structured interview with you or the person whom you suggest will help to give valuable insight for this research. Therefore, I am making a request to gain access to the relevant interviewee, and look forward to working with you to complete this research.

To protect the participant's privacy, this research will comply with the highest ethical standards and will not disclose any interviewee's personal identifiers to any third party. I also promise all data collected from participants will be used only for research purposes.

Thank you very much in advance for your support.

Yours sincerely,
(Legible signature)

Bahana Wiradanti
PhD Student at the Logistics and Operations Management Section
Cardiff Business School, Cardiff University

CARDIFF BUSINESS SCHOOL

RESEARCH ETHICS

Informed Consent Declaration – For Research Participants

This study is being conducted by Bahana Wiradanti who is a PhD student in Cardiff Business School under the supervision of Dr. Stephen Pettit (Pettit@cardiff.ac.uk), Dr. Andrew Potter (PotterAT@cardiff.ac.uk), Dr. Wessam Abouarghoub (AbouarghoubW@cardiff.ac.uk).

This project aims to explore historical background, current status and future plans for the development of peripheral ports in Indonesia. This will be used as the context for the PhD Thesis. The main purpose of the Thesis is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub.

Participation in this project will involve semi-structured interview about peripheral ports, location, infrastructure, human resource, development, also concerning the port company.

Participation in the study is entirely voluntary and participants can withdraw from the study at any time without giving a reason. Participants have the right not to answer or say "no comment" to any questions during the session. The company's approval in this study does not oblige respondents to participate in the study. Participation will not be linked in any way with job performance, nor will the researcher share the names of participants with the company.

The interviews will be audio-recorded only when it is approved by the participants. Transcripts of the interview will be available to the participants.

Participants may also ask questions at any time and discuss any concerns with either the researcher Bahana Wiradanti (WiradantiB@cardiff.ac.uk) or Dr. Stephen Pettit (Pettit@cardiff.ac.uk).

All information provided during the interview will be held anonymously so that it will not be possible to trace information or comments back to individual contributors. Information will be stored in accordance with the current Data Protection Act 1998.

Participants can request information and feedback about the purpose and results of the study by applying directly to the researcher Bahana Wiradanti (WiradantiB@cardiff.ac.uk).

16 March 2016
Researcher – Bahana Wiradanti
Cardiff Business School
Cardiff University,
Aberconway Building, Colum Drive,
CF10 3EU

CARDIFF BUSINESS SCHOOL

RESEARCH ETHICS

Consent Form – Anonymous Data

I understand that this study is being conducted by Bahana Wiradanti (WiradantiB@cardiff.ac.uk) who is a PhD student in Cardiff Business School under the supervision of Dr. Stephen Pettit (Pettit@cardiff.ac.uk), Dr. Andrew Potter (PotterAT@cardiff.ac.uk), Dr. Wessam Abouarghoub (AbouarghoubW@cardiff.ac.uk).

I understand that this project aims to explore historical background, current status and future plans for the development of peripheral ports in Indonesia. This will be used as the context for Bahana Wiradanti's PhD Thesis, and the main purpose of the Thesis is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub.

I understand that my participation in this project will involve semi-structured interview about peripheral ports, location, infrastructure, human resource, development, also concerning the port company. It will require 60 minutes of my time.

I understand that my participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason. I also have the right not to answer or say "no comment" to any questions during the session. I understand that the company's approval in this study does not oblige me to participate in the study. My participation will not be linked in any way with job performance, and my name will not be shared with the company.

I understand that the interviews will be audio-recorded only under my approval. Transcripts of the interview will be available for me.

I understand that I am free to ask any questions at any time. If for any reason I have second thoughts about my participation in this project, I am free to withdraw or discuss my concerns with the researcher Bahana Wiradanti (WiradantiB@cardiff.ac.uk) or Dr. Stephen Pettit (Pettit@cardifff.ac.uk).

I understand that the information provided by me will be held confidentially and securely, such that only the researcher can trace this information back to me individually. The information will be retained for up to one year and will then be deleted or destroyed. I understand that if I withdraw my consent I can ask for the information I have provided to be deleted/destroyed in accordance with the Data Protection Act 1998.

I, _____(name) consent to participate in the study.

I, _____(name) allow my interview to be audio-recorded.

Date:

ETHICS 2 (Revised)
FULL ETHICAL APPROVAL FORM (STAFF/PHD STUDENTS) or students referring their form for a full ethical review

Cardiff Business School
Ysgol Busnes Caerdydd

(For guidance on how to complete this form, please see Learning Central – CARBS RESEARCH ETHICS)

If your research will involve patients or patient data in the NHS then you should secure approval from the NHS Health Research Authority. Online applications are available on http://www.hra.nhs.uk/resources/applying-for-reviews/

NB: Safety Guidelines for researchers working alone on projects – please go to this University's web link to learn about safety policies - http://www.cf.ac.uk/osheu/index.html

Name of Lead Researcher : **Bahana Wiradanti (C1459530)**

School: Cardiff Business School, Logistics and Operations Management (LOM) section

Email: WiradantiB@cardiff.ac.uk

Names of other Researchers: -

Email addresses of other Researchers : -

Title of Project:

CONTAINER HUB PORT DEVELOPMENT IN PERIPHERAL LOCATION:
CASE STUDY OF INDONESIA'S EASTERN REGION

Start and Estimated End Date of Project: 5th December 2016 - 31 January 2017

Aims and Objectives of the Research Project:
This project is the main data collection for PhD. Data is collected by semi-structured interviews to main stakeholders of port development in peripheral locations in Indonesia. An initial interview before has been done in April-May 2016 and later on a quantitative data collection by survey will be conducted in late 2017. The aim of the Thesis itself is to identify factors for a peripheral port to reduce its peripherality by becoming a hub.

Please indicate any sources of funding for this project:
This PhD research is sponsored by Indonesian Port Corporation (PT. Pelabuhan Indonesia II), a state owned port operator company in Indonesia.

1. Describe the methodology to be applied in the project

Overall the Thesis will be using a mixed methods approach, to be able to understand the research problem completely instead of only by qualitative or quantitative data alone (Cresswell 2014, p.19). There are three basic mixed methods design, which are convergent parallel, explanatory sequential and exploratory sequential (Cresswell 2014). More specifically, this research follows the exploratory sequential mixed methods where qualitative phase is conducted before quantitative phase. This enables the researcher to explore and develop measurements from respondents in the qualitative phase, then test it in a larger sample in the quantitative phase (Cresswell 2014, p.226).

The interview itself is following a semi-structured approach because it provides chances to explore and 'probe' answers from participants (Saunders et al. 2007, p.315) and enables the researcher to follow up the participant's answer (Bryman and Bell 2003, p.343).

References:
Bryman, A. and Bell, E. 2003. *Business research methods*. 1 ed. New York: Oxford University Press.
Cresswell, J. W. 2014. *Research Design Qualitative, Quantitative and Mixed Methods Approaches*. 4 ed. Los Angeles: SAGE Publications Inc.
Saunders, M. et al. 2007. *Research methods for business students*. 4 ed. London: Prentice Hall.

2. *Describe the participant sample who will be contacted for this Research Project. You need to consider the number of participants, their age, gender, recruitment methods and exclusion/inclusion criteria.*

Semi structured interviews will be conducted with main players or stakeholders of port development in peripheral locations in Indonesia. These main players as described in the following diagram have been identified from literature review and previous interviews (preliminary data collection in April-May 2016).

Respondents' positions are high level such as Managers up to Directors, aged from 30 to 60 years old, both gender male and female. The total number of participants will be ±40. They are mainly recruited through the interviewer's professional connections and considering their current job/position. There are no gender and age discrimination issues. Most of the respondents are located in Jakarta, Indonesia. Since the researcher has limited time in Jakarta and there are difficulties to meet respondents that are located outside Jakarta or in other islands of Indonesia, therefore phone call and video calls will also be conducted.

[1]The organisations with which the respondents to the survey are employed are a combination of regulators (e.g. government bodies) and customers to the researcher's sponsor. The researcher, although sponsored by the Indonesian Port Corporation, is undertaking independent research which will not influence or be influenced by the sponsor. There are not therefore envisaged to be any ethical issues in respect of this study.

3. *Describe the method by which you intend to gain consent from participants.*

Consent from participants will be sought by telephone and e-mail prior to the interviews. [2]Confirmation of consent will be requested by email in order to ensure consent is confirmed and a record obtained. As part of the interview process, a brief introduction to the research purpose and plan will be given. This will also ensure the clarity of ethical considerations between interviewer and interviewee. Participation in this research is entirely voluntary and each interviewee can withdraw from the research at any time without giving a reason. Permission will also be sought to record the information from interviews.

[1] Respond to the First question
[2] Respond to the Second question

[3]On completion of an interview, a transcript will be made of the discussion. The interviewee will be asked whether they wish to confirm that the transcript is a record of the meeting. If they indicate that this is the case, a copy will be sent to them with a request to confirm their agreement.

[4]During the interview process, the interviewee will be asked to confirm whether they require a summary of the research findings. If they indicate a request, on completion of the research (submission of PhD and successful viva voce) a summary document will be emailed to them. Hence, The summary of the research findings will be available to the participants at the end of the entire research work. [5]Research findings will be made available to the supervisor and sponsors, in the same form as for participants.

The invitation letter and the consent form which will be given to prospective participants are shown in the Appendix-1 and Appendix-2. The questions for interviews are attached in Appendix-3.

4. *Please make a clear and concise statement of the ethical considerations raised by the project and how you intend to deal with them throughout the duration of the project. (Please use additional sheets where necessary.)*

Relevant steps to be taken in this research will rigorously follow the Association Business Schools (ABS) ethics guide. Appropriate anonymity and confidentiality will be guaranteed for the participants. Respondents will be informed that their details will be kept anonymous in the final version of the thesis. Respondents will have the right not to answer any questions during the session. If required, the respondent is able to answer "no comment" at any time if they feel uncomfortable about the question. Even if the company, where the respondent works at, approves to participate in this study, it does not oblige respondents to participate in the study. Participation will not be linked in any way with their job performance, nor will the researcher share the names of participants with the company.

In addition, permission will be granted for the interview to be recorded. Notes will be taken during interviewing and the respondent has the right to review the notes made during the session. If specified by the respondent, the name of the respondent will not be recorded on the tape and will be substituted by letters (e.g. Mr.X). These recorded materials will be kept locked in a suitable case or encrypted digitally when not being used.

[6]All data collected will remain confidential to the researcher and will not be made available to any other party, including the sponsor. The data will be anonymised and identification data will be kept separately from the dataset. Transcripts of the interviews will be available to the participants if requested as discussed in Section 3.

5. *Please complete the following in relation to your research project:*

		Yes	No	n/a
(a)	Will you describe the main details of the research process to participants in advance, so that they are informed about what to expect?	☒	☐	☐
(b)	Will you tell participants that their participation is voluntary?	☒	☐	☐
(c)	Will you obtain written consent for participation?	☒	☐	☐
(d)	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
(e)	If you are using a questionnaire, will you give participants the option of omitting questions they do not want to answer?	☐	☐	☒
(f)	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
(g)	Will you offer to send participants findings from the research (e.g. copies of publications arising from the research)?	☒	☐	☐
(h)	Will you consider and take into account issues concerning the health and safety of the researchers and participants. The University's health and safety policy can be found at http://www.cf.ac.uk/osheu/index.html	☐	☐	☒

[3] Respond to the Third question
[4] Respond to the Fourth question
[5] Respond to the Sixth question
[6] Respond to the Fifth question.

(i)	If working with children and young people please confirm that you have visited this website : Working with children and young people and vulnerable adults please go to web link - http://www.cardiff.ac.uk/racdv/ethics/guidelines/index.html	☐	☐	☒
(j)	**DATA PROTECTION:** (A) Will any non-anonymised and/or personalised data be generated? (B) If "YES" will it be stored beyond the end of the project/archived? http://www.cardiff.ac.uk/socsi/research/researchethics/destructionofdata/index.html	☐ ☐	☒ ☒	☐ ☐
(k)	The study does not include the use of a drug? If no, you will need to contact Research Governance before submission (resgov.cf.ac.uk)	☒	☐	☐
(l)	The study does not involve the collection or use of human tissue? If no, you will need to contact Research Governance before submission (resgov.cf.ac.uk)	☒	☐	☐

PLEASE NOTE:
If you have ticked **No** to any of 5(a) to 5(l), please give an explanation on a separate sheet.
(Note: N/A = not applicable)

If there are any other potential ethical issues that you think SREC should consider please explain them on a separate sheet. It is your obligation to bring to the attention of the Committee any ethical issues not covered on this form and checklist.
This completed application form to be submitted to SREC Secretary Lainey Clayton Claytonlb@cf.ac.uk to be reviewed by the School's Research Ethics Committee.

Signed: Bahana WDanti

Print Name: Bahana Wiradanti

Date: 1 December 2016

SUPERVISOR'S DECLARATION (Student researchers only): As the supervisor for this student project I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Signed: SPettit

Print Name: Dr. Stephen Pettit

Date: 1/12/16

TWO copies of this form (and attachments) MUST BE OFFICIALLY STAMPED BEFORE any research project work is undertaken -

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed School procedures and is now approved.

Stamped by School :
Date:

Appendix-1

Invitation Letter

Cardiff Business School
Ysgol Busnes Caerdydd

Logistics and Operations Management Section
Cardiff Business School, Aberconway Building
Cardiff University
Cardiff, United Kingdom
CF10 3EU

Company Address

Dear (name),

I am a third-year PhD student at Cardiff Business School conducting the academic research on the topic of peripheral port and container hub port development. The main purpose of my Thesis is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub.

As the first phase, I am collecting qualitative data through interviews to explore the perception on peripherality, peripheral ports and willingness to invest in peripheral ports as transport hubs. Respondents for these interviews are stakeholders of port development in peripheral locations in Indonesia, which includes ports, shipping companies, freight forwarder/logistics associations, cargo owner (port users), central and local government, and financial funding source. The interview questions are attached in this letter. The second phase will be a survey in July 2017. This research is sponsored by PT. Pelabuhan Indonesia II (or Indonesia Port Corporation).

As your company/authority is involved in the ports and maritime logistic industry, conducting an in-depth semi-structured interview with you or the person whom you suggest will help to give valuable insight for this research. Therefore, I am making a request to gain access to the relevant interviewee, and look forward to working with you to complete this research. Ideally, I would need about an hour. Any time at your convenience would be fine. I am in Jakarta from the 5th December 2016 to 27th January 2017. My assistant, Mrs. Greesia (0816 183 3304 / 021- 864 0531), will contact you in the near future regarding the interview schedule.

To protect the participant's privacy, this research will comply with the highest ethical standards and will not disclose any interviewee's personal identifiers to any third party. I also promise all data collected from participants will be used only for research purposes. The researcher, although sponsored by the Indonesian Port Corporation, is undertaking independent research which will not influence or be influenced by the sponsor.

Thank you very much in advance for your support.

Yours sincerely,
(Legible signature)

Bahana Wiradanti
PhD Student at the Logistics and Operations Management Section
Cardiff Business School, Cardiff University
Email: WiradantiB@cardiff.ac.uk

Appendix-2

Cardiff Business School
Ysgol Busnes Caerdydd

CARDIFF BUSINESS SCHOOL

RESEARCH ETHICS

Informed Consent Declaration – For Research Participants

This study is being conducted by Bahana Wiradanti who is a PhD student in Cardiff Business School under the supervision of Dr. Stephen Pettit (Pettit@cardiff.ac.uk), Dr. Andrew Potter (PotterAT@cardiff.ac.uk), Dr. Wessam Abouarghoub (AbouarghoubW@cardiff.ac.uk).

This project will involve semi-structured interview, to explore the perception on peripherality and peripheral ports for your business/institution, also explore willingness to invest in peripheral ports as transport hubs. The main purpose of the Thesis is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub.

Participation in the study is entirely voluntary and participants can withdraw from the study at any time without giving a reason. Participants have the right not to answer or say "no comment" to any questions during the session. The company's approval in this study does not oblige respondents to participate in the study. Participation will not be linked in any way with job performance, nor will the researcher share the names of participants with the company.

The interviews will be audio-recorded only when it is approved by the participants. Transcripts of the interview and research findings will be available to the participants if requested. Participants may also ask questions at any time and discuss any concerns with either the researcher Bahana Wiradanti (WiradantiB@cardiff.ac.uk) or Dr. Stephen Pettit (Pettit@cardiff.ac.uk).

The researcher, although sponsored by the Indonesian Port Corporation, is undertaking independent research which will not influence or be influenced by the sponsor. All information provided during the interview will be held anonymously so that it will not be possible to trace information or comments back to individual contributors. Information will be stored in accordance with the current Data Protection Act 1998.

Participants can request information and feedback about the purpose and results of the study by applying directly to the researcher Bahana Wiradanti (WiradantiB@cardiff.ac.uk).

8 November 2016
Researcher – Bahana Wiradanti
Cardiff Business School
Cardiff University,
Aberconway Building, Colum Drive,
CF10 3EU

Cardiff Business School
Ysgol Busnes Caerdydd

Consent Form – Anonymous Data

I understand that this study is being conducted by Bahana Wiradanti (WiradantiB@cardiff.ac.uk) who is a PhD student in Cardiff Business School under the supervision of Dr. Stephen Pettit (Pettit@cardiff.ac.uk), Dr. Andrew Potter (PotterAT@cardiff.ac.uk), Dr. Wessam Abouarghoub (AbouarghoubW@cardiff.ac.uk).

I understand that this project will involve semi-structured interview, to explore the perception on peripherality and peripheral ports for your business/institution, also explore willingness to invest in peripheral ports as transport hubs. The main purpose of the Thesis is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub. It will require 1 hour of my time.

I understand that my participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason. I also have the right not to answer or say "no comment" to any questions during the session. I understand that the company's approval in this study does not oblige me to participate in the study. My participation will not be linked in any way with job performance, and my name will not be shared with the company.

I understand that the interviews will be audio-recorded only under my approval. Transcripts of the interview and research findings will be available for me if requested. I understand that I am free to ask any questions at any time. If for any reason I have second thoughts about my participation in this project, I am free to withdraw or discuss my concerns with the researcher Bahana Wiradanti (WiradantiB@cardiff.ac.uk) or Dr. Stephen Pettit (Pettit@cardifff.ac.uk).

I understand that the researcher, although sponsored by the Indonesian Port Corporation, is undertaking independent research which will not influence or be influenced by the sponsor. The information provided by me will be held confidentially and securely, such that only the researcher can trace this information back to me individually. The information will be retained for up to one year and will then be deleted or destroyed. I understand that if I withdraw my consent I can ask for the information I have provided to be deleted/destroyed in accordance with the Data Protection Act 1998.

I, _____(name) consent to participate in the study.

I, _____(name) allow my interview to be audio-recorded.

Date:

Appendix-3

Cardiff Business School
Ysgol Busnes Caerdydd

INTERVIEW QUESTIONS

Introduction

Respondent's Profile:

- Which company or government institution do you work in (port operator, shipping line, etc.)?
- What are its main service or production?
- What are your role in the company or institution?
- How long have you been working here?

Explanation about this research:
The purpose of this research is to explore important factors for a peripheral port to reduce its peripherality by becoming a hub. Specifically about hub port development in Sorong, in the east region of Indonesia, as seen in the following map.

Part-1 Peripherality

1. Are you familiar with the term peripheral / peripherality?
2. What does the term peripherality mean to you?
3. How important do you think peripheral locations are? Why?
4. How far a location is considered peripheral?
   e.g. feeder services / pioneer services, product sales or production, or projects in the government
5. Is your business related with peripheral location?
6. Are there plans to expand your business in more peripheral locations? Why?

Part-2 Peripheral Ports

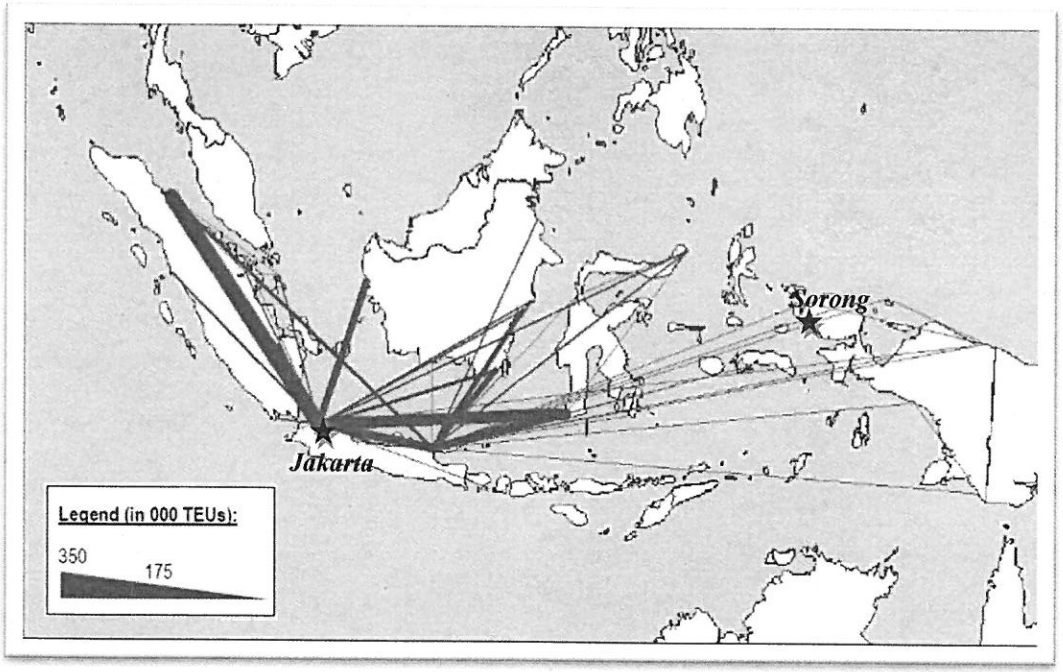
1. What are criteria of peripheral ports?
2. Are ports in peripheral locations important for your business/projects? Why?
3. What are potential / benefits of peripheral ports (as hubs) for your business/projects?
4. What are the criteria for a potential peripheral port to become hub?
5. How do you measure growth in the peripheral?

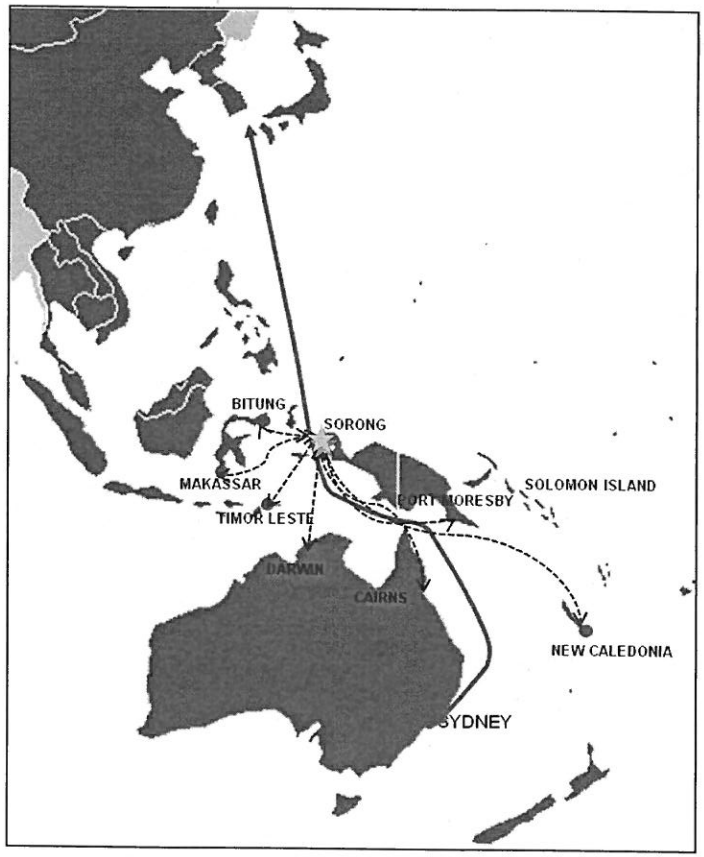
Part-3 Willingness to Invest

1. Who are the main stakeholders in peripheral port development?
2. Are you willing to invest in peripheral ports?
3. What are the critical facilities that should be developed for ports in peripheral locations?

Follow up/Probing Questions:

- Can you confirm whether peripherality is important for you?
- Can you confirm whether you are willing to invest in peripheral ports/terminal?





Source: XYZ-Port-Company and Drewry-Maritime-Advisors (2012)

Indonesia's Domestic Cargo Distribution and Port of Sorong Development Plan

Link between PhD Research Questions and Interview Questions

Research Question	Keyword	Sub Research Question	Qualitative Interview Questions
RQ1: What is peripherality in the context of maritime transport and logistics?	Perception of peripherality	a) How is peripherality perceived? b) What are the levels of peripherality? c) What are the advantage and disadvantage of peripherality?	1. Are you familiar with the term peripheral / peripherality? 2. What does the term peripherality mean to you? 3. How important do you think peripheral locations are? Why? 4. How far a location is considered peripheral? e.g. feeder services / pioneer services, product sales or production, or projects in the government 5. Is your business related with peripheral location? 6. Are there plans to expand your business in more peripheral locations? Why?
RQ2: What are peripheral ports in the context of maritime transport and logistics?	Perception of peripheral ports	a) What is considered as peripheral port? b) What are potential benefits of peripheral ports? c) What are criteria/characteristics of a potential peripheral port to become hub?	1. What are criteria of peripheral ports? 2. Are ports in peripheral locations important for your business/projects? Why? 3. What are potential / benefits of peripheral ports for your business/projects? 4. What are the criteria for a potential peripheral port to become hub? 5. How do you measure growth in the peripheral?
RQ3: How are the stakeholders' willingness to invest in hub port in peripheral location?	Willingness	a) Who are the main stakeholders in peripheral port development? b) How important are peripheral port development for each stakeholder? c) How are their willingness to invest in peripheral ports?	1. Who are the main stakeholders in peripheral port development? 2. Are you willing to invest in peripheral ports? 3. What are the critical facilities that should be developed for ports in peripheral locations?
RQ4: What are the factors related to stakeholders' willingness to develop hub port in a peripheral location?	Critical Factors	a) How does concentration factors occur? b) How does deconcentration factors occur? c) How does port selection factors occur? d) How should transhipment services or other value added services provided?	(Survey Questionnaire Later in July 2017)

Cardiff Business School
Ysgol Busnes Caerdydd

Wiradanti, Bahana
Cardiff University Business School

13 April 2017

Dear Bahana:

Ethics Approval Reference: 1617018
Project Title: Container Hub Port Development in Peripheral Location: Case Study of Indonesia's Eastern Region

I would like to confirm that your project has been granted ethics approval as it has met the review conditions.

Should there be a material change in the methods or circumstances of your project, you would in the first instance need to get in touch with us for re-consideration and further advice on the validity of the approval.

I wish you both the best of luck on the completion of your research project.

Yours sincerely,

Electronic signature via email

Debbie Foster
Chair of the ethics sub-committee
Email: CARBSResearchOffice@cardiff.ac.uk

Cardiff Business School
Ysgol Busnes Caerdydd

Wiradanti, Bahana
Cardiff University Business School

7 December 2016

Dear Bahana:

Ethics Approval Reference: 1617018
Project Title: Container Hub Port Development in Peripheral Location: Case Study of Indonesia's Eastern Region

I would like to confirm that your project has been granted ethics approval as it has met the review conditions.

Should there be a material change in the methods or circumstances of your project, you would in the first instance need to get in touch with us for re-consideration and further advice on the validity of the approval.

I wish you both the best of luck on the completion of your research project.

Yours sincerely,

Electronic signature via email

Debbie Foster
Chair of the ethics sub-committee
Email: CARBSResearchOffice@cardiff.ac.uk

ETHICS 2

FULL ETHICAL APPROVAL FORM (STAFF/PHD STUDENTS) or students referring their form for a full ethical review

Cardiff Business School
Ysgol Busnes Caerdydd

(For guidance on how to complete this form, please see Learning Central – CARBS RESEARCH ETHICS)

If your research will involve patients or patient data in the NHS then you should secure approval from the NHS Health Research Authority. Online applications are available on http://www.hra.nhs.uk/resources/applying-for-reviews/

NB: Safety Guidelines for researchers working alone on projects – please go to this University's web link to learn about safety policies - http://www.cf.ac.uk/osheu/index.html

Name of Lead Researcher : **Bahana Wiradanti (C1459530)**

School: CARBS, Logistics and Operations Management (LOM)

Email: WiradantiB@cardiff.ac.uk

Names of other Researchers: -

Email addresses of other Researchers : -

Title of Project:

CONTAINER HUB PORT DEVELOPMENT IN A PERIPHERAL LOCATION:
CASE STUDY OF INDONESIA'S EASTERN REGION

Start and Estimated End Date of Project: November 2017 – March 2018

Aims and Objectives of the Research Project:
This project is the last phase of data collection for PhD Thesis. Data is collected by online questionnaire survey to main stakeholders of port development in peripheral locations in Indonesia.

Two qualitative data collection has been done before in April – May 2016 (preliminary interviews) and in December 2016 – January 2017 (main interviews). Hence, this final phase is to confirm the research with quantitative approach.

The aim of the Thesis itself is to identify areas for economic growth by upgrading peripheral ports to become a hub and willingness to invest in peripheral locations.

Please indicate any sources of funding for this project:
This PhD research is sponsored by Indonesian Port Corporation (PT. Pelabuhan Indonesia II), a state owned port operator company in Indonesia. However, The researcher is undertaking independent research which will not influence or be influenced by the sponsor. This is informed to respondents throughout the whole data collection process.

1. *Describe the methodology to be applied in the project*

➢ Mixed Methods

Overall the Thesis is using a mixed methods approach, to be able to understand the research problem completely instead of only by qualitative or quantitative data alone (Cresswell 2014, p.19). There are three basic mixed methods design, which are convergent parallel, explanatory sequential and exploratory sequential (Cresswell 2014). More specifically, this research follows the exploratory sequential mixed methods where qualitative phase is conducted before quantitative phase.

➢ Questionnaire Survey

This phase of my PhD research is the quantitative phase. The purpose is to test or confirm the results of previous qualitative interviews in a larger sample (Cresswell 2014, p.226). Questionnaire survey is used because it enables researcher to answer "who, what, where, how many and how much" types of research questions (Yin 2009, p.8). It also does not require control of behavioural events and focus on contemporary event, since in this research we only seek to understand respondents' behaviour without interfering them (Yin 2009, p.8).

➢ Online Questionnaire

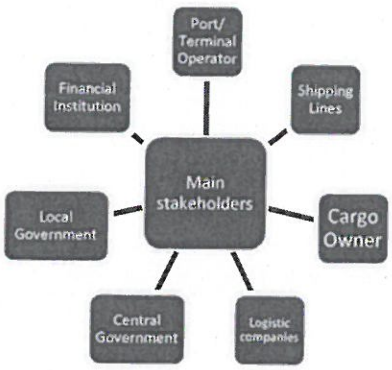
Moreover the survey will be conducted with the help of online questionnaire. The overview advantage of an online or web survey are it is cost effective, allows speed data collection, ease of implementation, allows time and geographic flexibility, also convenient for respondents to answer in their own pace (Callegaro et al 2015, pp.18-24).

References:
Callegaro, M. et al. 2015. *Web survey methodology*. London: SAGE Publications Ltd.
Cresswell, J. W. 2014. *Research Design Qualitative, Quantitative and Mixed Methods Approaches*. 4 ed. Los Angeles: SAGE Publications Inc.
Yin, R. K. 2009. *Case study research: design and method*. 4 ed. California: SAGE Publications.

PLEASE ATTACH COPIES OF QUE NNAIRES OR INTERVIEW TOPIC GUIDES TO THIS APPLICATION ☑ yes in Appendix

2. *Describe the participant sample who will be contacted for this Research Project. You need to consider the number of participants, their age, gender, recruitment methods and exclusion/inclusion criteria.*

Participants in this phase are the same as in the main interviews, however, in a larger sample than before. They are 7 main players which have been identified from literature review and previous interviews (preliminary data collection in April-May 2016). They are described in the following diagram: Port Operators, Shipping Lines, Cargo Owner, Logistics Companies, Central Government, Local Government, and Financial Institution.



The online survey will be developed in *Qualtrics*, which is supported by Cardiff University. The survey web page link will be shared by email and messaging service such as *Whatsapp* and *Linkedin*. We aim to get approximately 300 survey participants. Their positions are medium to high level such as Managers up to Directors, aged from 30 to 60 years old, both gender male and female. They are mainly recruited through the interviewer's professional connections, colleagues and networking, also considering their current job/position.

There are no gender and age discrimination issues hence it will not be asked in the suvey. They are located scattered across 34 provinces and different islands in Indonesia, although, still dominantly located in the capital city of Jakarta.

Purposive sampling will be conducted to identify potential respondents, especially judgement sampling and quota sampling. According to Sekaran (2003, p.277), judgement sampling is done when the researcher needs to gain information from the most relevant people and position. Meanwhile, quota sampling is done when the researcher needs to ensure that the different respondent groups are sufficiently represented using a certain quota (Sekaran 2003, p.278). Each of the 7 type of respondent should be represented.

The organisations with which the respondents to the survey are employed are a combination of regulators (e.g. government bodies) and customers to the researcher's sponsor. The researcher, although sponsored by the Indonesian Port Corporation, is undertaking independent research which will not influence or be influenced by the sponsor. This will be reminded in the invitation email and messaging, also in the beginning page of the online survey (See Appendix). There are not therefore envisaged to be any ethical issues in respect of this study.

We plan to conduct the online survey pilot for one month (December 2017), then the main data collection for two months (January – February 2018). The online questionnaire will be able to be accessed through computer, tab and mobile phones.

Reference:
Sekaran, U. 2003. *Research methods for business*. 4 ed. New York: John Wiley and Sons, Inc.

3. *Describe the method by which you intend to gain consent from participants.*

Consent from participants will be asked on the second page of the online questionnaire, after a brief introduction about the research purpose in the first page. This will also ensure the clarity of ethical considerations for respondents. If they do not give consent, they can end the online survey page.

Participation in this research is entirely voluntary and each respondent can withdraw from the questionnaire at any time without giving a reason.

Respondents can request a summary of the research findings if they contact my email address, which will be reminded in the end of the survey. The summary document to the supervisor and sponsors are in the same form as for participants, after completion of the research (submission of PhD Thesis and successful viva voce).

Hence, we will not be able to trace any respondents' name and email address with their survey response. If they request the summary document, their email address identifier will be confidential only to the main researcher. The invitation email, consent form and questionnaire is attached in Appendix.

PLEASE ATTACH A COPY OF ALL INFORMATION WHICH WILL BE GIVEN TO PROSPECTIVE PARTICIPANTS (including invitation letter, briefing documents and, if appropriate, the consent form you will be using). 

4. *Please make a clear and concise statement of the ethical considerations raised by the project and how you intend to deal with them throughout the duration of the project.*

Relevant steps to be taken in this research will rigorously follow the Association Business Schools (ABS) ethics guide. Appropriate anonymity and confidentiality will be guaranteed for the participants.

Respondents are informed in the beginning that this is an independent research which will not influence or be influenced by any party including the sponsor. Afterwards, respondents will have to fill in the consent form page. Respondents are able to skip the questions, or even withdraw from the survey. No name and email identifier is gained in the survey, hence we will not be able to trace any respondents' identifier with their survey response.

Even if the gateway person in the company, where the respondent works at, approves to participate in this study, it does not oblige respondents to participate in the study. Participation is not be linked in any way with their job performance.

Respondents could only request the summary of research findings to the main researcher and their email address identifier will be confidential only to the main researcher. All data collected will remain confidential to the researcher and will not be made available to any other party, including the sponsor. The data will be anonymised and email identification data will be kept separately from the dataset.

5. *Please complete the following in relation to your research project:*

		Yes	No	n/a
(a)	Will you describe the main details of the research process to participants in advance, so that they are informed about what to expect?	☒	☐	☐
(b)	Will you tell participants that their participation is voluntary?	☒	☐	☐
(c)	Will you obtain written consent for participation?	☒	☐	☐
(d)	Will you tell participants that they may withdraw from the research at any time and for any reason?	☒	☐	☐
(e)	If you are using a questionnaire, will you give participants the option of omitting questions they do not want to answer?	☒	☐	☐
(f)	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
(g)	Will you offer to send participants findings from the research (e.g. copies of publications arising from the research)?	☒	☐	☐
(h)	Will you consider and take into account issues concerning the health and safety of the researchers and participants. The University's health and safety policy can be found at http://www.cf.ac.uk/osheu/index.html	☐	☐	☒
(i)	If working with children and young people please confirm that you have visited this website : Working with children and young people and vulnerable adults please go to web link - http://www.cardiff.ac.uk/racdv/ethics/guidelines/index.html	☐	☐	☒
(j)	**DATA PROTECTION:** (A) Will any non-anonymised and/or personalised data be generated? (B) If "YES" will it be stored beyond the end of the project/archived? http://www.cardiff.ac.uk/socsi/research/researchethics/destructionofdata/index.html	☐ ☐	☒ ☒	☐ ☐
(k)	The study does not include the use of a drug? If no, you will need to contact Research Governance before submission (resgov.cf.ac.uk)	☒	☐	☐
(l)	The study does not involve the collection or use of human tissue? If no, you will need to contact Research Governance before submission (resgov.cf.ac.uk)	☒	☐	☐

PLEASE NOTE:
If you have ticked **No** to any of 5(a) to 5(l), please give an explanation on a separate sheet.
(Note: N/A = not applicable)

Appendix

Invitation Email

Cardiff Business School
Ysgol Busnes Caerdydd

Logistics and Operations Management Section
Cardiff Business School, Aberconway Building
Cardiff University
Cardiff, United Kingdom
CF10 3EU

To : <<Name>>
<<Position, Company/Institution>>
Subject: Request for participation in PhD Research on Hub Port Development in a Peripheral Location

Dear Mr/Mrs/Ms (name),

I am Bahana Wiradanti, a third-year PhD student at Cardiff Business School conducting the academic research on the topic of Hub Port Development in a Peripheral Location. The main purpose of my Thesis is to identify areas for economic growth by upgrading peripheral ports to become a hub and identify willingness to invest in peripheral locations. This research is supported by PT. Pelabuhan Indonesia II (or Indonesia Port Corporation) and Cardiff University, United Kingdom.

I am collecting data through online questionnaire survey. **This is an independent research, which will not influence or be influenced by the sponsor.** Your responses will be kept strictly **confidential and anonymous.** The study does not relate with job performance.

Respondents needed are stakeholders of port development in peripheral locations in Indonesia, which includes Port Operators, Shipping Companies, Freight Forwarder/Logistics Companies, Cargo Owner/Port Users, Central Government, Local Government, Financial Institution, or others related. As your background is relevant, I am hoping you could participate in this survey and share it with other relevant colleagues to give valuable insight for this research.

The survey questions can be accessed by clicking this link:
<<Qualtrics Link>>
It can be accessed through your computer, tab or mobile phone. It takes 15 minutes to complete.

To protect the participant's privacy, this research will comply with the highest ethical standards and will not disclose any participant's personal identifiers to any party. I also promise all data collected from participants will be used only for research purposes.

Thank you very much for your support and participation in this important study.

Yours sincerely,
(Legible signature)

Bahana Wiradanti
PhD Student at the Logistics and Operations Management Section
Cardiff Business School, Cardiff University
Email: WiradantiB@cardiff.ac.uk

Invitation in Indonesian Language

Cardiff Business School
Ysgol Busnes Caerdydd

Logistics and Operations Management Section
Cardiff Business School, Aberconway Building
Cardiff University
Cardiff, United Kingdom
CF10 3EU

Kepada Yth : <<Nama>>
<<Jabatan, Perusahaan/Institusi>>
Judul : Permintaan untuk berpartisipasi dalam penelitian Doktoral S3 mengenai Pembangunan Pelabuhan *Hub* di Lokasi *Peripheral*

Kepada Yth Bapak/Ibu <<Nama>>,

Perkenalkan saya Bahana Wiradanti, mahasiswi doktoral S3 di *Cardiff Business School* yang menjalani penelitian akademik dengan topik Pembangunan Pelabuhan *Hub* di Lokasi *Peripheral*. Tujuan dari Disertasi S3 saya adalah untuk mengidentifikasi strategi pertumbuhan ekonomi dengan pembangunan Pelabuhan *peripheral* menjadi *hub* dan mengetahui keinginan berinvestasi di lokasi *peripheral*. Penelitian ini di sponsori oleh PT. Pelabuhan Indonesia II (*Indonesia Port Corporation*) dan *Cardiff University, United Kingdom*.

Saat ini saya sedang mengumpulkan data melalui kuesioner online. **Penelitian ini merupakan penelitian independen,** yang tidak mempengaruhi atau dipengaruhi oleh sponsor dalam bentuk apapun. Partisipasi Bapak/Ibu akan **dijamin kerahasiaannya dan anonim**. Studi ini tidak berkaitan dengan performansi kerja.

Responden yang dibutuhkan adalah stakeholder dari pembangunan Pelabuhan di lokasi *peripheral* di Indonesia, yaitu Operator Pelabuhan, Pelayaran, Pemilik Barang/Pengguna Jasa Pelabuhan, Perusahaan Logistik/Forwarder, Pemerintah Pusat, Pemerintah Daerah, Badan Pembiayaan, atau lainnya yang berkaitan. Sehubungan dengan latar belakang Bapak/Ibu relevan, maka dimohon bantuan Bapak/Ibu untuk berpartisipasi dan membagikan kuesioner ini kepada rekan-rekan yang terkait, sehingga bermanfaat untuk penelitian ini.

Kusioner survei dapat diakses melalui tautan berikut:
<<Qualtrics Link>>
Tautan dapat diakses melalui computer, tab maupun telepon genggam. Dibutuhkan 15 menit untuk menyelesaikannya.

Untuk melindungi privasi responden dan kerahasiaan, penelitian ini akan memenuhi standar etika yang tertinggi dan tidak membuka tanda pengenal apapun kepada pihak manapun. Saya juga berjanji bahwa seluruh data yang dikumpulkan hanya digunakan untuk tujuan penelitian.

Terima kasih atas bantuan dan partisipasi Bapak/Ibu dalam penelitian penting ini.

Hormat saya,
(Legible signature)

Bahana Wiradanti
PhD Student at the Logistics and Operations Management Section
Cardiff Business School, Cardiff University
Email: WiradantiB@cardiff.ac.uk

Consent Page

Cardiff Business School
Ysgol Busnes Caerdydd

QUESTIONNAIRE

Perception on Hub Port Development in a Peripheral Location

We invite you to participate in this research.

General Information:

1. This research is an **independent PhD academic work** to identify areas for economic growth by upgrading peripheral ports to become a hub and identify willingness to invest in peripheral locations.
2. Your responses will be kept strictly **confidential and anonymous.** The study does not relate with job performance.
3. Please provide your opinion according to your background and experience (Port Operators, Shipping Lines, Cargo Owner/Port User, Logistics Companies/Forwarder, Central Government, Local Government, Financial Institution, or others related).
4. If you think you are not the right person to answer the questionnaire, please pass it to the person who you think might be knowledgeable to answer.
5. This survey takes approximately 15 minutes to complete.

Thank you for your co-operation!

Bahana Wiradanti
PhD Student at the Logistics and Operations Management Section
Cardiff Business School, Cardiff University, CF10 3EU, United Kingdom
Email: WiradantiB@cardiff.ac.uk

Cardiff Business School
Ysgol Busnes Caerdydd

Kuesioner

Persepsi terhadap Pembangunan Pelabuhan *Hub* di Lokasi *Peripheral*

Mohon bantuan Bapak/Ibu untuk berpartisipasi dalam penelitian ini.

Informasi:

1. Penelitian ini merupakan **tugas independen akademik untuk Disertasi S3**, untuk mengidentifikasi strategi pertumbuhan ekonomi dengan pembangunan Pelabuhan *peripheral* menjadi *hub* dan mengetahui keinginan berinvestasi di lokasi *peripheral*.
2. Tanggapan Anda akan **dijaga kerahasiaannya** dan **anonim**. Penelitian tidak ada kaitannya dengan kinerja pekerjaan.
3. Mohon berikan pendapat berdasarkan latar belakang dan pengalaman Anda *(sebagai Operator Pelabuhan, Pelayaran, Pemilik Barang/Pengguna Jasa Pelabuhan, Perusahaan Logistik/Forwarder, Pemerintah Pusat, Pemerintah Daerah, Badan Pembiayaan, atau lainnya yang berkaitan).*
4. Jika Anda merasa bukan pihak yang tepat untuk menjawab kuesioner, mohon bantuannya untuk meneruskan kepada pihak yang lebih tepat menjawabnya.
5. Survey ini diperkirakan membutuhkan waktu penyelesaian selama 15 menit.

Terima kasih banyak untuk bantuan dan kerjasama Anda!

Bahana Wiradanti
PhD Student at the Logistics and Operations Management Section
Cardiff Business School, Cardiff University, CF10 3EU, United Kingdom
Email: WiradantiB@cardiff.ac.uk

Cardiff Business School
Ysgol Busnes Caerdydd

Persetujuan untuk berpartisipasi
Consent to participate

[X] **Saya memahami informasi yang diberikan dan menyetujui untuk berkontribusi dalam penelitian ini.**
I understand and agree with the information given above and I am giving my consent to participate in this research.

[X] **Saya bekerja sebagai salah satu stakeholder tersebut (Operator Pelabuhan, Pelayaran, Pemilik Barang/Pengguna Jasa Pelabuhan, Perusahaan Logistik/Forwarder, Pemerintah Pusat, Pemerintah Daerah, Badan Pembiayaan, atau lainnya yang berkaitan).**
I work as one of stakeholder mentioned (Port Operators, Shipping Lines, Cargo Owner/Port User, Logistics Companies/Forwarder, Central Government, Local Government, Financial Institution, or others related).

If there are any other potential ethical issues that you think SREC should consider please explain them on a separate sheet. It is your obligation to bring to the attention of the Committee any ethical issues not covered on this form and checklist.
This completed application form to be submitted to SREC Secretary Lainey Clayton Claytonlb@cf.ac.uk to be reviewed by the School's Research Ethics Committee.

Print Name: BAHANA WIRADANTI

Date: 1/11/17

SUPERVISOR'S DECLARATION (Student researchers only): As the supervisor for this student project I confirm that I believe that all research ethical issues have been dealt with in accordance with University policy and the research ethics guidelines of the relevant professional organisation.

Signed:

Print Name: S. PETTIT

Date: 1/11/17

TWO copies of this form (and attachments) MUST BE OFFICIALLY STAMPED BEFORE any research project work is undertaken -

STATEMENT OF ETHICAL APPROVAL

This project has been considered using agreed School procedures and is now approved.

Stamped by School :
Date:

Cardiff Business School
Ysgol Busnes Caerdydd

Wiradanti, Bahana
Cardiff Business School

14 December 2017

Dear Bahana:

Ethics Approval Reference: 1617062
Project Title: CONTAINER HUB PORT DEVELOPMENT IN A PERIPHERAL LOCATION: CASE STUDY OF INDONESIA'S EASTERN REGION

I would like to confirm that your project has been granted ethics approval as it has met the review conditions.

Should there be a material change in the methods or circumstances of your project, you would in the first instance need to get in touch with us for re-consideration and further advice on the validity of the approval.

I wish you both the best of luck on the completion of your research project.

Yours sincerely,

Electronic signature via email

Debbie Foster
Chair of the ethics sub-committee
Email: CARBSResearchOffice@cardiff.ac.uk

Introduction

KUESIONER

Cardiff Business School
Ysgol Busnes Caerdydd

Persepsi terhadap Pembangunan Pelabuhan Hub di Lokasi Peripheral

Perception on Hub Port Development in a Peripheral Location

Mohon bantuan Bapak/Ibu untuk berpartisipasi dalam penelitian ini.
We invite you to participate in this research.

Informasi:

1. Penelitian ini merupakan tugas independen akademik untuk Disertasi S3, untuk mengidentifikasi strategi pertumbuhan ekonomi dengan pembangunan Pelabuhan peripheral menjadi hub dan mengetahui keinginan berinvestasi di lokasi peripheral.
   This research is an independent PhD academic work to identify areas for economic growth by upgrading peripheral ports to become a hub and identify willingness to invest in peripheral locations.
2. Tanggapan Anda akan dijaga kerahasiaannya dan anonim. Penelitian ini tidak ada kaitannya dengan kinerja pekerjaan.
   Your responses will be kept strictly confidential and anonymous. This study does not relate with job performance.
3. Mohon berikan pendapat berdasarkan latar belakang dan pengalaman Anda (sebagai Operator Pelabuhan, Pelayaran, Pemilik Barang/Pengguna Jasa Pelabuhan, Perusahaan Logistik/Forwarder, Pemerintah Pusat, Pemerintah Daerah, Badan Pembiayaan, atau lainnya yang berkaitan).
   Please provide your opinion according to your background and experience (Port Operators, Shipping Lines, Cargo Owner/Port User, Logistics Companies/Forwarder, Central Government, Local Government, Financial Institution, or other related institution).
4. Jika Anda merasa bukan pihak yang tepat untuk menjawab kuesioner, mohon bantuannya untuk meneruskan kepada pihak yang lebih tepat menjawabnya.
   If you think you are not the right person to answer the questionnaire, please pass it to the person who you think might be knowledgeable to answer.
5. Pelabuhan peripheral adalah Pelabuhan yang tidak berlokasi di "pusat" dan tidak menjalankan fungsi hub (sebagai contoh: Sorong, Bitung, Makassar adalah peripheral dari Jakarta dan Surabaya. Jakarta adalah peripheral dari Singapura).
   Peripheral ports are ports not in the centre and not existing hubs (for example Sorong, Bitung and Makassar is peripheral to Jakarta and Surabaya; Jakarta is peripheral to Singapore).
6. Survey ini diperkirakan membutuhkan waktu penyelesaian selama 15-20 menit.
   This survey takes approximately 15-20 minutes to complete.

Terima kasih untuk bantuan dan kerjasama Anda!
Thank you!

Bahana Wiradanti
PhD Student in Logistics and Operations Management Section
Cardiff Business School, Cardiff University, CF10 3EU, United Kingdom
Email: WiradantiB@cardiff.ac.uk

Consent

Persetujuan untuk berpartisipasi

Consent to participate

- Saya memahami informasi yang diberikan dan menyetujui untuk berkontribusi dalam penelitian ini.
  I understand and agree with the information given above and I am giving my consent to participate in this research.
- Saya bekerja sebagai salah satu stakeholder tersebut (Operator Pelabuhan, Pelayaran, Pemilik Barang/Pengguna Jasa Pelabuhan, Perusahaan Logistik/Forwarder, Pemerintah Pusat, Pemerintah Daerah, Badan Pembiayaan, atau lainnya yang berkaitan).
  I work as one of stakeholder mentioned (Port Operators, Shipping Lines, Cargo Owner/Port User, Logistics Companies/Forwarder, Central Government, Local Government, Financial Institution, or others related).

Setuju	Tidak Setuju
Agree	Do not agree
☐	☐

Background

Latar Belakang

Background

Saya bekerja di perusahaan atau instansi berikut (pilih satu)
I work in this company or institution (choose one)

- ○ Operator Pelabuhan
  Port Operator
- ○ Pelayaran
  Shipping Line
- ○ Pemilik Barang / Pengguna Jasa Pelabuhan

Cargo Owner / Port User

- Perusahaan Logistik / Forwarder
  Logistics Companies / Freight Forwarder
- Pemerintah Pusat
  Central Government
- Pemerintah Daerah
  Local Government
- Badan Pembiayaan
  Financial Institution
- Lainnya
  Others

Saya telah bekerja di perusahaan atau instansi ini selama .....(tahun)

I have worked in this company or institution for .....(years)

- dibawah 5
  under 5
- 5 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- diatas 25
  over 25

Saya telah bekerja di bidang ini selama .....(tahun)

I have worked in this field for .....(years)

- dibawah 5
  under 5
- 5 - 10
- 11 - 15
- 16 - 20
- 21 - 25
- diatas 25
  over 25

Lokasi tempat kerja saya di Provinsi .....

Province of location where I work in is .....

Aceh
Sumatera Utara
Sumatera Barat
Riau
Kepulauan Riau
Jambi
Sumatera Selatan
Bangka Belitung
Bengkulu
Lampung

Background-Specific

Perusahaan tempat saya bekerja ini dimiliki oleh.....

My current company/employer is owned by.....

- Negara
  State Owned
- Swasta Dalam Negeri
  Private National
- Swasta Luar Negeri / Internasional
  Private International

Background-Specific2

Kargo barang utama perusahaan ini adalah.....

Main cargo of this company is.....

- Barang Konsumsi Bergerak Cepat
  Fast moving consumer goods
- Perikanan & Hasil Laut
  Fisheries
- Pertambangan, Minyak & Gas
  Mining, oil & gas
- Produk Perkebunan
  Plantation products
- Produk Perhutanan
  Forestry products
- Makanan Pokok, Sayur, Buah
  Staple food, vegetables, fruits
- Bahan Kimia, Plastik
  Chemicals, Plastics
- Konstruksi
  Construction
- Otomotif & Onderdil
  Automotive & Spare part
- Mesin & Alat Berat
  Machinery & Heavy equipment
- Pariwisata, Kerajinan
  Tourism & Crafts
- Peternakan
  Animal, poultry farms
- Elektronik
  Electronics
- Baju, Tekstil, Sepatu
  Clothes, Textile, Shoes
- Lainnya
  Others

Scenario

Skenario

Scenario

- Tujuan dari penelitian ini adalah untuk mengidentifikasi strategi pertumbuhan ekonomi, bukan untuk mendukung pihak manapun.
  The purpose of this study is to identify areas for economic growth, not politically supporting any parties.
- Pelabuhan peripheral adalah Pelabuhan yang tidak berlokasi di "pusat" dan tidak menjalankan fungsi hub (sebagai contoh: Sorong, Bitung, Makassar adalah peripheral dari Jakarta dan Surabaya. Jakarta adalah peripheral dari Singapura).
  Peripheral ports are ports not in the centre and not existing hubs (for example Sorong, Bitung and Makassar is peripheral to Jakarta and Surabaya; Jakarta is peripheral to Singapore).
- Menjadi hub TIDAK berarti semua/banyak Pelabuhan di Indonesia agar menjadi hub, hanya Pelabuhan peripheral tertentu.

Becoming a hub does NOT mean all ports in Indonesia should be a hub, only particular ports in peripheral location.

- Menjadi hub TIDAK berarti berdasarkan atas status politik.
  Becoming a hub is NOT based on political status.
- Menjadi hub berarti menjalankan fungsi transhipment, konsolidasi kargo dari pulau-pulau sekitarnya, menumbuhkan skala ekonomi.
  Becoming a hub is to conduct transhipment, consolidate cargo from surrounding islands, developing economies of scale.
- Menjadi hub dapat berarti berubahnya level hierarki Pelabuhan tersebut (lokal, regional, nasional dan internasional).
  Becoming a hub could mean a change in hierarchical level of the port (local, regional, national and international level).
- Mohon berikan jawaban tanggapan Anda menurut latar belakang Anda, dan tidak melihat opini stakeholder lainnya.
  Please give your response according to your background and do not look at other stakeholders' opinion.

○ Saya memahami skenario yang diberikan
I understand the scenario given

1-Port Convenience

Kenyamanan Pelabuhan

Port Convenience

Persoalan di bawah ini berkaitan dengan kenyamanan pelabuhan.
Mohon isi seberapa penting hal-hal berikut.
The following questions relates with port convenience. Please determine the importance of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI....
TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Jarak masuk ke daratan dari laut yang terdekat Shortest inland distance from the sea	○	○	○	○	○	○	○
Kompetisi antar pelabuhan yang lebih kecil Less competition for port	○	○	○	○	○	○	○
Rute pelayaran yang tersedia Available sea routes	○	○	○	○	○	○	○
Kemacetan rendah Low congestion	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Jasa penanganan kargo beragam Various cargo handling services, multipurpose	○	○	○	○	○	○	○
Terintegrasi Bea Cukai Customs integration	○	○	○	○	○	○	○
Kedalaman pelabuhan yang alami Natural depth	○	○	○	○	○	○	○
Keselamatan dan keamanan Safety and security	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Jarak laut yang dekat dengan rute pelayaran utama Short sea distance to main routes	○	○	○	○	○	○	○
Jarak laut yang dekat dengan pelabuhan pengumpul/pengumpan feeder Short sea distance to feeder ports	○	○	○	○	○	○	○
Jarak laut yang jauh dengan pelabuhan hub lainnya Further away sea distance to other hub ports	○	○	○	○	○	○	○
Reputasi pelabuhan Port's reputation	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kompetisi dengan mode transportasi lainnya yang lebih kecil Less competition with other modes of transport	○	○	○	○	○	○	○
Kompetisi antar pelayaran yang lebih kecil Less competition for shipping	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI…. (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- ☐ Jarak masuk ke daratan dari laut yang terdekat
Shortest inland distance from the sea
- ☐ Kompetisi antar pelabuhan yang lebih kecil
Less competition for port
- ☐ Rute pelayaran yang tersedia
Available sea routes
- ☐ Kemacetan rendah
Low congestion
- ☐ Jasa penanganan kargo beragam
Various cargo handling services, multipurpose
- ☐ Keselamatan dan keamanan
Safety and security
- ☐ Jarak laut yang dekat dengan rute pelayaran utama
Short sea distance to main routes
- ☐ Jarak laut yang dekat dengan pelabuhan pengumpul feeder
Short sea distance to feeder ports
- ☐ Jarak laut yang jauh dengan pelabuhan utama hub lain
Further away sea distance to other hub ports
- ☐ Reputasi pelabuhan
Port's reputation
- ☐ Terintegrasi Bea Cukai
Customs integration
- ☐ Kedalaman pelabuhan yang alami
Natural depth
- ☐ Kompetisi dengan mode transportasi lainnya yang lebih kecil
Less competition with other modes of transport
- ☐ Kompetisi antar pelayaran yang lebih kecil
Less competition for shipping

2-Port Tangible Aspects

Aspek Fisik Pelabuhan

Port Tangible Aspects

Persoalan di bawah ini berkaitan dengan aspek fisik pelabuhan.

Mohon isi seberapa penting hal-hal berikut.

The following questions relates with port tangible aspects. Please determine the importance of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI….

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kedalaman alur dan kolam pelabuhan Depth of port channel and basin	○	○	○	○	○	○	○
Panjang dermaga Quay or berth length	○	○	○	○	○	○	○
Alat Bongkar Muat Cranes for loading-unloading	○	○	○	○	○	○	○
Lapangan penumpukan petikemas Container stacking yard	○	○	○	○	○	○	○
Tempat penyimpanan, gudang, tanki curah cair Storage space, warehouse, liquid bulk tank	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Ketersediaan fasilitas penanganan muatan lainnya Availability of other handling equipment	○	○	○	○	○	○	○
Keandalan fasilitas penanganan muatan lainnya Reliability of other handling equipment	○	○	○	○	○	○	○
Kapasitas Pelabuhan keseluruhan Overall port capacity	○	○	○	○	○	○	○
Infrastruktur Pelabuhan standar Standardised port infrastructure	○	○	○	○	○	○	○
Peningkatan infrastruktur yang berkelanjutan Continuous infrastructure upgrade	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI…. (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- ☐ Kedalaman alur dan kolam pelabuhan — Depth of port channel and basin
- ☐ Panjang dermaga — Quay or berth length
- ☐ Alat Bongkar Muat — Cranes for loading-unloading
- ☐ Lapangan penumpukan petikemas — Container stacking yard
- ☐ Ketersediaan fasilitas penanganan muatan lainnya — Availability of other handling equipment
- ☐ Keandalan fasilitas penanganan muatan lainnya — Reliability of other handling equipment
- ☐ Tempat penyimpanan, gudang, tanki curah cair — Storage space, warehouse, liquid bulk tank
- ☐ Kapasitas Pelabuhan keseluruhan — Overall port capacity
- ☐ Infrastruktur Pelabuhan standar — Standardised port infrastructure
- ☐ Peningkatan infrastruktur yang berkelanjutan — Continuous infrastructure upgrade

3-Port Intangible Aspects

Aspek Non-Fisik Pelabuhan

Port Intangible Aspects

Persoalan di bawah ini berkaitan dengan aspek non-fisik pelabuhan.

Mohon isi seberapa penting hal-hal berikut.

The following questions relates with port intangible aspects. Please determine the importance of these items.

	Sama Sekali Tidak Penting — Not at all important	Tidak Penting — Low important	Agak Tidak Penting — Slightly Important	Netral — Neutral	Agak Penting — Moderately important	Lebih Penting — Very Important	Sangat Penting — Extremely Important
Jasa logistik (pergudangan, freight forwarding, LCL, dll) — Logistics services (warehousing, freight forwarding, LCL handling, etc.)	○	○	○	○	○	○	○
Jasa transhipment (mengumpulkan kargo dari berbagai asal untuk dikirim ke berbagai tujuan) — Transhipment service (consolidate cargo from different origins to be sent to different destinations)	○	○	○	○	○	○	○
Kemampuan Teknologi Informasi (informasi dan komunikasi) — IT ability (information & communication)	○	○	○	○	○	○	○
Stabilitas tenaga kerja pelabuhan — Stability of port's labour	○	○	○	○	○	○	○

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI….

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting — Not at all important	Tidak Penting — Low important	Agak Tidak Penting — Slightly Important	Netral — Neutral	Agak Penting — Moderately important	Lebih Penting — Very Important	Sangat Penting — Extremely Important
Efisiensi Pelabuhan keseluruhan — Overall port efficiency	○	○	○	○	○	○	○
Efisiensi penanganan kargo keseluruhan — Cargo handling efficiency	○	○	○	○	○	○	○
Kerusakan kargo yang rendah — Low cargo damage	○	○	○	○	○	○	○
Insentif dan promosi — Incentives and promotions	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting — Not at all important	Tidak Penting — Low important	Agak Tidak Penting — Slightly Important	Netral — Neutral	Agak Penting — Moderately important	Lebih Penting — Very Important	Sangat Penting — Extremely Important
Manajemen Pelabuhan dengan kualitas terstandar — Standard quality of Port Management	○	○	○	○	○	○	○
Hubungan baik antara manajerial dengan tenaga kerja — Good management and labour relations	○	○	○	○	○	○	○
Servis 24 jam 7 hari seminggu — 24/7 service	○	○	○	○	○	○	○
Komunikatif dan responsif — Communicative and responsive	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting — Not at all important	Tidak Penting — Low important	Agak Tidak Penting — Slightly Important	Netral — Neutral	Agak Penting — Moderately important	Lebih Penting — Very Important	Sangat Penting — Extremely Important
Sistem pelacakan kargo — Cargo tracking system	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kualitas SDM keseluruhan Overall quality of human resource	○	○	○	○	○	○	○
Menguntungkan secara finansial Financially profitable	○	○	○	○	○	○	○
Menginisiasi fasilitas kontainerisasi Developing/Initiating containerisation facilities	○	○	○	○	○	○	○
Jasa Pelabuhan lainnya (air, sampah, bunkering, dll.) Other value added services (water, rubbish, bunkering, etc.)	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI…. (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- ☐ Efisiensi Pelabuhan keseluruhan
Overall port efficiency
- ☐ Efisiensi penanganan kargo keseluruhan
Cargo handling efficiency
- ☐ Hubungan baik antara manajerial – tenaga kerja
Good management and labour relations
- ☐ Servis 24 jam 7 hari seminggu
24/7 service
- ☐ Kerusakan kargo yang rendah
Low cargo damage
- ☐ Insentif dan promosi
Incentives and promotions
- ☐ Jasa logistik (pergudangan, freight forwarding, LCL, dll)
Logistics services (warehousing, freight forwarding, LCL handling, etc.)
- ☐ Jasa transhipment
Transhipment service
- ☐ Kemampuan Teknologi Informasi (informasi dan komunikasi)
IT ability (information & communication)
- ☐ Stabilitas tenaga kerja pelabuhan
Stability of port's labour
- ☐ Manajemen Pelabuhan kualitas terstandar
Standard quality of Port Management
- ☐ Komunikatif dan responsif
Communicative and responsive
- ☐ Sistem Pelacakan Kargo
Cargo tracking system
- ☐ Kualitas SDM keseluruhan
Overall quality of human resource
- ☐ Menguntungkan secara finansial
Financially profitable
- ☐ Menginisiasi fasilitas kontainerisasi
Developing/ initiating containerisation facilities
- ☐ Jasa Pelabuhan lainnya (air, sampah, bunkering, dll.)
Other value added services (water, rubbish, bunkering, etc.)

4-Port Cluster & Environment

Kluster Pelabuhan dan Lingkungannya

Port Cluster and Environment

Persoalan di bawah ini berkaitan dengan kluster pelabuhan dan lingkungannya.

Mohon isi seberapa penting hal-hal berikut.

The following questions relates with port cluster and environment. Please determine the importance of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI….

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Jalan umum yang menghubungkan kota-kota sekitar dengan Pelabuhan Public road connecting surrounding cities to the port	○	○	○	○	○	○	○
Jalan tol akses ke pelabuhan Toll road connecting the port	○	○	○	○	○	○	○
Rel kereta akses ke pelabuhan Railways connecting the port	○	○	○	○	○	○	○
Jalur sungai akses ke pelabuhan Waterway/river connecting the port	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Penghubung transportasi antarmoda Intermodal transport links	○	○	○	○	○	○	○
Ketersediaan lahan untuk ekspansi pelabuhan dan logistik Available land for port and logistics expansion	○	○	○	○	○	○	○
Harga tanah relatif murah Relatively cheap land	○	○	○	○	○	○	○
Sejumlah populasi penduduk perkotaan tertentu yang dekat dengan pelabuhan tersebut Certain population size in metropolitan area near the port	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Luas area perkotaan tertentu yang dekat dengan pelabuhan tsb Certain size of metropolitan area near the port	○	○	○	○	○	○	○
Agen forwarder internasional International forwarding agents	○	○	○	○	○	○	○
Biaya tenaga kerja relatif murah Relatively cheap labour cost	○	○	○	○	○	○	○
Pusat logistik bongkar muat barang untuk konsolidasi kargo dari darat Load centres for inland cargo consolidation	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Jalan umum yang menghubungkan ke pusat bongkar muat barang di darat dari pelabuhan Public road access to load centres from port	○	○	○	○	○	○	○
Zona Ekonomi Khusus Special Economic Zones	○	○	○	○	○	○	○
Area hinterland yang cukup (hinterland adalah area daratan yang dilayani oleh pelabuhan) Sufficient hinterland (hinterland is the land area served by the port)	○	○	○	○	○	○	○
Kekuatan pasar, aktifitas ekonomi hinterland Market power, economic activity of hinterland	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Area hinterland yang saling tumpang tindih Overlapping hinterland	○	○	○	○	○	○	○
Ekspansi foreland daerah tujuan (foreland adalah area daratan tujuan yang dilayani oleh pelabuhan) Expansion of foreland (foreland is the land area as destination served by the port)	○	○	○	○	○	○	○
Ketersediaan infrastruktur dasar yang mencukupi di derah tsb (Listrik, air, jalan, dll) Existing basic infrastructure (electricity, water, road, etc.)	○	○	○	○	○	○	○
Pasar lokal yang baru New local market	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kesuburan tanah setempat Fertility of local land	○	○	○	○	○	○	○
Dekat tempat objek wisata Near tourism sites	○	○	○	○	○	○	○
Lokasi industri baru New industrial sites	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI.... (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- ☐ Jalan umum yang menghubungkan kota-kota sekitar dengan Pelabuhan
Public road connecting surrounding cities to the port
- ☐ Jalan umum yang menghubungkan ke pusat bongkar muat barang di darat dari pelabuhan
Public road access to load centres from port
- ☐ Jalan tol akses ke pelabuhan
Toll road connecting the port
- ☐ Zona Ekonomi Khusus
Special Economic Zones
- ☐ Rel kereta akses ke pelabuhan
Railways connecting the port
- ☐ Area hinterland yang cukup
Sufficient hinterland
- ☐ Jalur sungai akses ke pelabuhan
Waterway/river connecting the port
- ☐ Kekuatan pasar, aktifitas ekonomi hinterland
Market power, economic activity of hinterland
- ☐ Penghubung transportasi antarmoda
Intermodal transport links
- ☐ Area hinterland yang saling tumpang tindih
Overlapping hinterland

- [ ] Ketersediaan lahan untuk ekspansi Pelabuhan dan logistic
  Available land for port and logistics expansion
- [ ] Ekspansi foreland daerah tujuan
  Expansion of foreland
- [ ] Harga tanah relatif murah
  Relatively cheap land
- [ ] Ketersediaan infrastruktur dasar yang mencukupi di derah tsb (Listrik, air, jalan, dll)
  Existing basic infrastructure (electricity, water, road, etc.)
- [ ] Sejumlah populasi penduduk perkotaan tertentu
  Certain population size in metropolitan area
- [ ] Pasar lokal yang baru
  New local market
- [ ] Luas area perkotaan tertentu
  Certain size of metropolitan area
- [ ] Kesuburan tanah setempat
  Fertility of local land
- [ ] Agen forwarder internasional
  International forwarding agents
- [ ] Dekat tempat objek wisata
  Near tourism sites
- [ ] Biaya tenaga kerja relatif murah
  Relatively cheap labour cost
- [ ] Lokasi industri baru
  New industrial sites
- [ ] Pusat logistik bongkar muat barang untuk konsolidasi
  Load centres for inland cargo consolidation

5-Cargo

Kargo

Cargo

Persoalan di bawah ini berkaitan dengan kargo. Mohon isi seberapa penting hal-hal berikut.

The following questions relates with cargo. Please determine the importance of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI....

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Volume kargo keseluruhan Overall cargo volume	○	○	○	○	○	○	○
Volume kargo transhipment (kargo yang dikumpulkan dari berbagai asal untuk dikirim ke berbagai tujuan) Transhipment cargo volume (consolidated cargo from different origins to be sent to different destinations)	○	○	○	○	○	○	○
Volume kargo kontainer Container cargo volume	○	○	○	○	○	○	○
Volume kargo lokal Local cargo volume	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Meningkatnya kebutuhan akan transhipment container Increasing need for container transhipment	○	○	○	○	○	○	○
Volume barang khusus Niche market, specialised cargo volume	○	○	○	○	○	○	○
Skala ekonomi dari meningkatnya total kargo Economies of scale from increased cargo throughput	○	○	○	○	○	○	○
Kargo bernilai harga tinggi High value cargo	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kargo bernilai harga rendah Low value cargo	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Pemetaan kargo Mapping of cargo	○	○	○	○	○	○	○
Ketersediaan kargo sumber daya alam Availability of natural resource cargo	○	○	○	○	○	○	○
Ketersediaan kargo bahan baku untuk industri/manufaktur Availability of raw material cargo for industry/manufacturing	○	○	○	○	○	○	○
Kargo ekspor yang berkelanjutan Export cargo on continuous basis	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI.... (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- [ ] Volume kargo keseluruhan
  Overall cargo volume
- [ ] Kargo bernilai harga tinggi
  High value cargo
- [ ] Volume kargo transhipment
  Transhipment cargo volume
- [ ] Kargo bernilai harga rendah
  Low value cargo

- [ ] Volume kargo kontainer
  Container cargo volume
- [ ] Volume kargo lokal
  Local cargo volume
- [ ] Meningkatnya kebutuhan akan transhipment container
  Increasing need for container transhipment
- [ ] Volume barang khusus
  Niche market, specialised cargo volume
- [ ] Skala ekonomi dari meningkatnya total kargo
  Economies of scale from increased cargo throughput
- [ ] Pemetaan kargo
  Mapping of cargo
- [ ] Ketersediaan kargo sumber daya alam
  Availability of natural resource cargo
- [ ] Ketersediaan kargo bahan baku untuk industri/manufaktur
  Availability of raw material cargo for industry/manufacturing
- [ ] Kargo ekspor yang berkelanjutan
  Export cargo on continuous basis

6-Private Sector Involvement

Partisipasi Sektor Swasta

Private Sector Involvement

Persoalan di bawah ini berkaitan dengan partisipasi sektor swasta.

Mohon isi seberapa penting hal-hal berikut.

The following questions relates with private sector involvement. Please determine the importance of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI....

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Partisipasi sektor swasta dalam operasional Pelabuhan (konsesi, penyewaan, Bangun-Guna-Serah, dll) Private sector involvement in operations (concession, leasehold, Build Operate Transfer, etc.)	○	○	○	○	○	○	○
Sistem investasi yang meyakinkan Sound investment system	○	○	○	○	○	○	○
Bantuan finansial untuk perusahaan investasi Financial assistance for investing companies	○	○	○	○	○	○	○
Kebijakan kontrak yang eksklusif untuk terminal khusus Exclusive contracts policy for dedicated terminal	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Investasi yang terkonsentrasi Concentration of investment	○	○	○	○	○	○	○
Strategi operator pelabuhan internasional Strategy of international port operators	○	○	○	○	○	○	○
Relasi yang kuat antara operator/otoritas pelabuhan dengan pelayaran Strong relations between port/port authority and shipping	○	○	○	○	○	○	○
Partisipasi swasta dalam kepemilikan pelabuhan Private sector involvement in port ownership/ port devolution	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Keterlibatan pelayaran dalam terminal Shipping involvement in terminal	○	○	○	○	○	○	○
Terbentuknya aliansi pelayaran Shipping alliance formation	○	○	○	○	○	○	○
Tidak melakukan investasi berlebihan Not over investing	○	○	○	○	○	○	○
Adanya kewirausahaan lokal Local entrepreneurship	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kolaborasi dengan industri lokal Collaboration with local industries	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kolaborasi dengan pelayaran Collaboration with shipping lines	○	○	○	○	○	○	○
Pembagian fase tahapan yang jelas (waktu dan besarnya investasi) Clear phases of investment (time and amount of investments)	○	○	○	○	○	○	○
Partisipasi dalam program Tanggung Jawab Sosial Perusahaan (CSR) Involve in Corporate Social Responsibility (CSR) programmes	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Insentif untuk pemain lokal sebagai inisiator Incentives for first local partners	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Monopoli yang lebih sedikit Less monopoly	○	○	○	○	○	○	○
Partisipasi sector swasta dalam Perencanaan Nasional Private sector involvement in National Planning	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI…. (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- ☐ Partisipasi sektor swasta dalam operasional Pelabuhan (konsesi, penyewaan, Bangun-Guna-Serah, dll)
Private sector involvement in operations (concession, leasehold, Build Operate Transfer, etc.)
- ☐ Tidak investasi berlebihan
Not over investing
- ☐ Sistem investasi yang meyakinkan
Sound investment system
- ☐ Adanya kewirausahaan lokal
Local entrepreneurship
- ☐ Bantuan finansial untuk perusahaan investasi
Financial assistance for investing companies
- ☐ Kolaborasi dengan industri lokal
Collaboration with local industries
- ☐ Kebijakan kontrak yang eksklusif untuk terminal khusus
Exclusive contracts policy for dedicated terminal
- ☐ Kolaborasi dengan pelayaran
Collaboration with shipping lines
- ☐ Investasi yang terkonsentrasi
Concentration of investment
- ☐ Pembagian fase tahapan yang jelas (waktu dan besarnya investasi)
Clear phases of investment (time and amount of investments)
- ☐ Strategi operator Pelabuhan internasional
Strategy of international port operators
- ☐ Partisipasi dalam program Tanggung Jawab Sosial Perusahaan (CSR)
Involve in Corporate Social Responsibility (CSR) programmes
- ☐ Relasi yang kuat antara operator/otoritas Pelabuhan dengan pelayaran
Strong relations port/port authority with shipping
- ☐ Insentif untuk pemain lokal sebagai inisiator
Incentives for first local partners
- ☐ Partisipasi swasta dalam kepemilikan pelabuhan
Private sector involvement in port ownership/ port devolution
- ☐ Monopoli yang lebih sedikit
Less monopoly
- ☐ Keterlibatan pelayaran dalam terminal
Shipping involvement in terminal
- ☐ Partisipasi sector swasta dalam Perencanaan Nasional
Private sector involvement in National Planning
- ☐ Terbentuknya aliansi pelayaran
Shipping alliance formation

7-Government Investment & Policy

Investasi dan Kebijakan Pemerintah

Government Investment and Policy

Persoalan di bawah ini berkaitan dengan investasi dan kebijakan pemerintah.

Mohon isi seberapa penting hal-hal berikut.

The following questions relates with government investment and policy. Please determine the importance of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI….

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kebijakan pemerintah untuk memprioritaskan pelabuhan peripheral Government policy to prioritise peripheral ports	○	○	○	○	○	○	○
Dukungan perencanaan pelabuhan dan logistik nasional Supported by national planning for port and logistics	○	○	○	○	○	○	○
Dukungan Perencanaan pemerintah provinsi/lokal Supported by Local and Provincial government planning	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Stabilitas politik Political stability	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Dukungan kebijakan bea cukai Supported by customs regulation	○	○	○	○	○	○	○
Dukungan kebijakan ekspor impor dan perdagangan internasional Supported by export import and international trade policy	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Potongan / pembebasan Pajak Tax cut / exemption	○	○	○	○	○	○	○
Administrasi pemerintah provinsi/lokal yang efisien Efficient Local and Provincial government administration	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Kerjasama Otoritas Pelabuhan (regulator) dan operator Active interface between Port Authority (regulator) and port operator	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Inisiatif pemerintah provinsi/lokal Local and provincial government initiative	○	○	○	○	○	○	○
Kesesuaian dengan hukum cabotage/proteksi Aligned with cabotage law/ protectionism	○	○	○	○	○	○	○
Kebijakan spesifik tertentu (contoh: moratorium penangkapan ikan, alur laut kepulauan, dll) Specific policy (e.g. fishing moratorium, archipelagic sea lanes)	○	○	○	○	○	○	○

	Sama Sekali Tidak Penting Not at all important	Tidak Penting Low important	Agak Tidak Penting Slightly Important	Netral Neutral	Agak Penting Moderately important	Lebih Penting Very Important	Sangat Penting Extremely Important
Berkurangnya birokrasi Less bureaucracy	○	○	○	○	○	○	○
Inisiatif pemerintah pusat (contoh: subsidi) Central Government initiatives (e.g. subsidy)	○	○	○	○	○	○	○
Pemerintah pusat berkoordinasi dengan pemerintah lokal/provinsi dan pihak swasta Central government coordination with local/provincial government and private sector	○	○	○	○	○	○	○

Mohon isi 3 (tiga) prioritas terpenting dari hal-hal berikut.

Please determine the 3 (three) most important of these items.

UNTUK MENJADI HUB, PELABUHAN DI LOKASI PERIPHERAL PERLU MEMILIKI.... (3 prioritas)

TO BECOME HUB, A PERIPHERAL PORT NEEDS TO HAVE...

- ☐ Kebijakan pemerintah untuk memprioritaskan Pelabuhan peripheral
Government policy to prioritise peripheral ports
- ☐ Kerjasama Otoritas Pelabuhan (regulator) dan operator
Active interface of Port Authority (regulator) and port operator
- ☐ Dukungan perencanaan pelabuhan dan logistik nasional
Supported by national planning for port and logistics
- ☐ Inisiatif pemerintah provinsi/lokal
Local and provincial government initiative
- ☐ Dukungan perencanaan pemerintah provinsi/lokal
Supported by Local and Provincial government planning
- ☐ Kesesuaian dengan hukum cabotage/proteksi
Aligned with cabotage law/ protectionism
- ☐ Stabilitas politik
Political stability
- ☐ Kebijakan spesifik tertentu (contoh: moratorium penangkapan ikan, alur laut kepulauan, dll)
Specific policy (e.g. fishing moratorium, archipelagic sea lanes)
- ☐ Dukungan kebijakan bea cukai
Supported by customs regulation
- ☐ Berkurangnya birokrasi
Less bureaucracy
- ☐ Dukungan kebijakan ekspor impor dan perdagangan internasional
Supported by export import and international trade policy
- ☐ Inisiatif pemerintah pusat (contoh: subsidi)
Central Government initiatives (e.g. subsidy)
- ☐ Potongan / pembebasan Pajak
Tax cut / exemption
- ☐ Pemerintah pusat berkoordinasi dengan pemerintah lokal/provinsi dan pihak swasta
Central government coordination with local/provincial government and private sector
- ☐ Administrasi pemerintah provinsi/local yang efisien
Efficient Local and Provincial government administration

Priority

Perbandingan Prioritas

Priority Comparison

Mohon urutkan tujuh hal berikut menurut tingkat prioritasnya dari nilai 1 sampai dengan 7 (dengan 1 sebagai yang paling prioritas).

Please determine the priority of these items from 1 to 7 (with 1 as the most prioritised).

AGAR PELABUHAN PERIPHERAL DAPAT MENJADI HUB...

FOR A PERIPHERAL PORT TO BECOME HUB...

	1	2	3	4	5	6	7
Kenyamanan Pelabuhan Port convenience	○	○	○	○	○	○	○
Aspek Fisik Pelabuhan Port Tangible Aspects	○	○	○	○	○	○	○
Aspek Non Fisik Pelabuhan Port Intangible Aspects	○	○	○	○	○	○	○
Kluster Pelabuhan dan lingkungannya Port cluster and environment	○	○	○	○	○	○	○
Kargo Cargo	○	○	○	○	○	○	○
Partisipasi sektor swasta Private sector involvement	○	○	○	○	○	○	○
Investasi dan kebijakan pemerintah Government investment & policy	○	○	○	○	○	○	○

WIllingness

Keinginan Berinvestasi di Lokasi Peripheral

Willingness to invest in peripheral locations

Mohon isi seberapa besar keinginan organisasi Anda terhadap hal-hal berikut.

Please determine your organisation's willingness for these items.

ORGANISASI SAYA INGIN MELAKUKAN INVESTASI UNTUK EKSPANSI BISNIS/PROYEK DI DAERAH PERIPHERAL JIKA....

WE ARE WILLING TO INVEST IN EXPANDING BUSINESS/PROJECT IN PERIPHERAL LOCATIONS IF...

	Sama sekali tidak ingin Very unwilling	Tidak ingin Unwilling	Agak tidak ingin Slightly unwilling	Netral Neutral	Agak ingin Moderately willing	Ingin Willing	b A
Kami mendapat potongan separuh dari biaya transit pelabuhan We get twofold transit cost advantage	○	○	○	○	○	○	
Kami mendapat potongan separuh dari biaya jasa pelabuhan We get twofold port service advantage	○	○	○	○	○	○	
Kami mendapat potongan separuh dari biaya transit dan jasa pelabuhan We get twofold transit and port service advantage	○	○	○	○	○	○	
Kami mendapat terminal khusus We get a dedicated terminal	○	○	○	○	○	○	

	Sama sekali tidak ingin Very unwilling	Tidak ingin Unwilling	Agak tidak ingin Slightly unwilling	Netral Neutral	Agak ingin Moderately willing	Ingin Willing	b A
Kami mendapat potongan separuh dari biaya penyimpanan We get twofold storage cost advantage	○	○	○	○	○	○	

	Sama sekali tidak ingin Very unwilling	Tidak ingin Unwilling	Agak tidak ingin Slightly unwilling	Netral Neutral	Agak ingin Moderately willing	Ingin Willing	b A
Kami dapat berkontribusi untuk pertumbuhan ekonomi daerah tersebut We can contributes to economic growth in the region	○	○	○	○	○	○	
Kami dapat menjadi yang pertama menguasai bisnis/pasar di daerah tersebut We can become the first to dominate the business/market in that area/region	○	○	○	○	○	○	
Lainnya (isilah kotak berikut) Others (fill in the blank)	○	○	○	○	○	○	

Thanks

Terima kasih atas bantuan Bapak/Ibu

Thank you for your participation

Jawaban Anda anonym dan tidak dapat ditelusuri.

Your responses are anonymous and can not be traced.

Permintaan untuk ringkasan hasil studi dapat dikirimkan ke alamat email: **WiradantiB@cardiff.ac.uk.**

Alamat email Anda terjamin kerahasiannya.

To request the summary of research findings, please email to:

WiradantiB@cardiff.ac.uk.

Your email address will be kept confidential.